



43rd International Conference on Software Engineering

*Madrid
goes Virtual*

**Main Conference
PROGRAM**
May 25th – 28th 2021

<https://conf.researchr.org/home/icse-2021>



@ICSEconf

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Main conference overview

May 25 th Tuesday	May 26 th Wednesday	May 27 th Thursday	May 28 th Friday
Opening ceremony OPENING →			Closing ceremony CLOSING →
Keynote DARÍO GIL →	Keynote MICHAEL LYU →	Keynote JEANNETTE WING →	
Meet with DARÍO GIL →	Meet with MICHAEL LYU →	Meet with JEANNETTE WING →	
Keynote PREM DEVANBU →	Keynote ELAINE WEYUKER →	JSEET Keynote DAVID GARLAN →	
Meet with PREM DEVANBU →	Meet with ELAINE WEYUKER →		
Technical Track Awards and ACM Europe Council Best Paper Award AWARDS →	Other ACM SIGSOFT Awards AWARDS →	ICSE 2011 Most Influential Paper Award ANDREA ARCURI, LIONEL BRIAND →	
ACM SIGSOFT Outstanding Research Award PREM DEVANBU →		Meet with ANDREA ARCURI, LIONEL BRIAND →	Meet with DIETER ROMBACH →
		Other ICSE Awards AWARDS →	Other IEEE TCSE Awards AWARDS →
			Town Hall TOWN HALL →
Technical Track			
Journal First			
SEIP			
NIER			
SEIS			
JSEET			
Networking			
Posters	Demos		
Technical Briefing NLP FOR REQUIREMENTS ENGINEERING: TASKS, TECHNIQUES, TOOLS, AND TECHNOLOGIES →	Technical Briefing REACTIVE SYNTHESIS WITH SPECTRA: A TUTORIAL →	Technical Briefing DECODING GROUNDED THEORY FOR SOFTWARE ENGINEERING →	Technical Briefing ADVANCES IN CODE SUMMARIZATION →
Technical Briefing HANDS-ON SESSION ON THE DEVELOPMENT OF TRUSTWORTHY AI SOFTWARE →		Technical Briefing BAYESIAN DATA ANALYSIS FOR SOFTWARE ENGINEERING →	Technical Briefing THE SOFTWARE CHALLENGES OF BUILDING SMARTCHATBOTS →
			SRC and SCORE Awards



May 25th overview

TIME CEST		Tuesday, May 25 th	
LIVE	MIRROR		
10:00 – 11:00	22:00 – 23:00	Opening Ceremony (10:00 – 10:30)	
		OPENING CEREMONY →	
11:00 – 12:00	23:00 – 00:00	Blended sessions (10:30 – 11:30)	
		CODE REVIEW: AUTOMATION →	
11:00 – 12:00	23:00 – 00:00	DEVELOPERS: BEHAVIOR →	
		DEEP NEURAL NETWORKS: VALIDATION 1 →	
12:00 – 13:00	00:00 – 01:00	Networking (11:30 – 12:00)	
		MEET YOUR PEERS →	
12:00 – 13:00	00:00 – 01:00	Blended sessions (12:05 – 13:15)	
		DEEP NEURAL NETWORKS: VALIDATION 2 →	
13:00 – 14:00	01:00 – 02:00	SEARCH-BASED SE & GENETIC OPERATIONS →	
		DEVELOPERS: GENERAL ISSUES →	
13:00 – 14:00	01:00 – 02:00	SOFTWARE REQUIREMENTS →	
		Break 30' (13:15 – 13:45)	
14:00 – 15:00	02:00 – 03:00	Technical Track Awards and ACM Europe Council Best Paper Award (13:45 – 14:00)	
		AWARDS CEREMONY →	
14:00 – 15:00	02:00 – 03:00	Keynote (14:00 – 14:45)	
		DARÍO GIL →	
15:00 – 16:00	03:00 – 04:00	Meet with (14:45 – 15:15)	
		DARÍO GIL →	
15:00 – 16:00	03:00 – 04:00	Networking (14:45 – 15:15)	
		INTRODUCTION TO GATHER.TOWN →	
16:00 – 17:00	04:00 – 05:00	COST ACTION NETWORK ON GENDER BALANCE →	
		(MIRROR IN MAY 26 AT 22:45 – 23:15)	
16:00 – 17:00	04:00 – 05:00	YOGA AND BREATHWORKS (LIVE SCHEDULE ONLY) →	
		SE RESEARCH @ HUAWEI (MIRROR SCHEDULE ONLY) →	
16:00 – 17:00	04:00 – 05:00	Posters (14:45 – 15:15)	
		POSTERS 1 →	
16:00 – 17:00	04:00 – 05:00	Blended sessions (15:20 – 16:15)	
		QUALITY ASSURANCE →	
17:00 – 18:00	05:00 – 06:00	DEEP NEURAL NETWORKS: SUPPORTING SE TASKS 1 →	
		OPEN SCIENCE →	
17:00 – 18:00	05:00 – 06:00	OBTAINING INFORMATION FROM APP USER REVIEWS 2 →	
		Social (16:15 – 16:35)	
18:00 – 19:00	06:00 – 07:00	GUITAR CONCERT →	
		Blended sessions (16:40 – 17:35)	
17:00 – 18:00	05:00 – 06:00	VARIABILITY AND PRODUCT LINES →	
		CONTINUOUS INTEGRATION →	
18:00 – 19:00	06:00 – 07:00	IDENTIFYING INFORMATION LEAKS →	
		DEVELOPERS: ONBOARDING →	
18:00 – 19:00	06:00 – 07:00	Break 15' (17:35 – 17:50)	
		ACM SIGSOFT Outstanding Research Award (17:50 – 18:00)	
19:00 – 20:00	07:00 – 08:00	AWARDS CEREMONY →	
		Keynote (18:00 – 19:00)	
19:00 – 20:00	07:00 – 08:00	PREM DEVANBU →	
19:00 – 20:00	07:00 – 08:00	Meet with (19:00 – 19:30)	
		PREM DEVANBU →	
20:00 – 21:00	08:00 – 09:00	Networking (19:00 – 19:30)	
		COMMUNITY SPEED NETWORKING (LIVE SCHEDULE ONLY) →	
20:00 – 21:00	08:00 – 09:00	COFFEE CHAT →	
		ICSE IS RUNNING →	
21:00 – 22:00	09:00 – 10:00	OPPORTUNITIES AT INVENIA LABS →	
		(LIVE SCHEDULE ONLY)	
20:00 – 21:00	08:00 – 09:00	Blended sessions (19:35 – 20:55)	
		DEEP NEURAL NETWORKS: GENERAL ISSUES →	
21:00 – 22:00	09:00 – 10:00	DEVELOPERS: OBSERVATIONAL STUDIES →	
		API: USAGE AND REFACTORING →	
21:00 – 22:00	09:00 – 10:00	OPEN SOURCE: PARTICIPANTS' MOTIVATIONS →	
		DEVELOPERS: NAMING METHODS AND VARIABLES →	
21:00 – 22:00	09:00 – 10:00	Panel (20:55 – 21:40)	
		ARE ACADEMICS WORKING ON THE RIGHT PROBLEMS? →	
22:00 – 23:00	10:00 – 11:00	(LIVE SCHEDULE: 20:55 – 21:40, MIRROR: THURSDAY 27th 11:00 – 11:45)	
		PASS THE MIC: SUSTAINABILITY FROM AROUND THE GLOBE (MIRROR SCHEDULE ONLY: 08:55 – 09:40) →	
21:00 – 22:00	09:00 – 10:00	ACM Students Research Competition (19:00 – 21:00)	
		SRC: POSTER SESSION 2 →	
21:00 – 22:00	09:00 – 10:00	(LIVE SCHEDULE ONLY)	
21:00 – 22:00	09:00 – 10:00	SCORE (19:00 – 21:15)	
		SCORE FINALISTS →	
21:00 – 22:00	09:00 – 10:00	(LIVE SCHEDULE ONLY)	
		Technical Briefing (19:35 – 21:50)	
21:00 – 22:00	09:00 – 10:00	HANDS ON SESSION ON THE DEVELOPMENT OF TRUSTWORTHY AI SOFTWARE →	



May 26th overview

TIME CEST		Wednesday, May 26th				
LIVE	MIRROR					
10:00 – 11:00	22:00 – 23:00	Keynote (10:00 – 10:45) MICHAEL LYU →				
11:00 – 12:00	23:00 – 00:00	Meet with (10:45 – 11:15) MICHAEL LYU →	Networking (10:45 – 11:15) COFFEE CHAT → MENTORING CIRCLE (LIVE SCHEDULE ONLY) → YOGA AND BREATHWORKS (LIVE SCHEDULE ONLY) → OPPORTUNITIES AT INVENIA LABS (LIVE SCHEDULE ONLY) → MEET FACEBOOK RECRUITING & RESEARCH (MIRROR SCHEDULE ONLY) →		Demos (10:45 – 11:15) EVOLUTION 1 →	
			Blended sessions (11:20 – 12:20) VULNERABILITIES IN ANDROID 1 → DEEP NEURAL NETWORKS: QUALITY ASSURANCE → MODEL CHECKING → TOOLS FOR THE PYTHON LANGUAGE → CODE REVIEW: OBSERVATIONAL STUDIES →			
			Social (12:20 – 12:50) FLAMENCO LESSON & PARTY 1 (LIVE SCHEDULE ONLY) →			
			Blended sessions (12:55 – 13:55) MODULARIZATION AND REUSABILITY → CONFIGURATION OF SOFTWARE SYSTEMS: TESTING → GUI DESIGN → PROGRAMMING: GENERAL ISSUES → DEEP NEURAL NETWORKS: HACKING →			
			JSEET (12:55 – 13:55) TEACHING SE IN REAL CONTEXTS →			
13:00 – 14:00	01:00 – 02:00	Break 35' (13:55 – 14:30)				
14:00 – 15:00	02:00 – 03:00	Blended sessions (14:30 – 15:30) DEFECT PREDICTION: AUTOMATION 1 → SELF-ADMITTED TECHNICAL DEBT → SOFTWARE LOG ANALYSIS → SMART CONTRACTS → HANDLING ECOSYSTEMS OF FORKED PROJECTS →		Technical Briefing (14:30 – 16:45) REACTIVE SYNTHESIS WITH SPECTRA: A TUTORIAL →		
		Networking (15:30 – 16:00) MEET YOUR PEERS → MENTORING CIRCLE → AST INDUSTRIAL COMPETITION (LIVE SCHEDULE ONLY) → SE RESEARCH @ HUAWEI (MIRROR SCHEDULE ONLY) →				
15:00 – 16:00	03:00 – 04:00	Blended sessions (16:05 – 17:05) FUZZING → API: EVOLUTION AND MAINTENANCE 1 → OBSERVATIONAL STUDIES: DIFFERENT DOMAINS → MODELS AND DSLS →				
		Break 15' (17:05 – 17:20)				
16:00 – 17:00	04:00 – 05:00	Other ACM SIGSOFT Awards (17:20 – 17:30) AWARDS CEREMONY →				
18:00 – 19:00	06:00 – 07:00	Keynote (17:30 – 18:15) ELAINE WEYUKER →			Industry Case Studies (18:00 – 21:10) SPANISH INDUSTRY CASE STUDIES (LIVE SCHEDULE ONLY) →	
		Meet with (18:15 – 18:45) ELAINE WEYUKER →	Networking (18:15 – 18:45) COFFEE CHAT → MENTORING CIRCLE (MIRROR SCHEDULE ONLY) → WAIN'21 (LIVE SCHEDULE ONLY) → YOU MIGHT BE STUDYING TECHNICAL DEBT AND NOT KNOW IT (LIVE SCHEDULE ONLY) → FACEBOOK LAUNCHES NEW RESEARCH AWARD OPPORTUNITY (LIVE SCHEDULE ONLY) →			Demos (18:15 – 18:45) VERIFICATION →
			Blended sessions (18:50 – 19:50) TESTING: AUTOMATIC TEST GENERATION → DEVELOPERS: EXPERIMENTS → CODE COMPLETION → SOME BIG COMPANIES' PRACTICES: CASES AT FACEBOOK, GOOGLE & IBM →			
			Panel (19:50 – 20:35) WHAT IS A NIER PAPER IN SOFTWARE ENGINEERING? →			
			Blended sessions (20:40 – 21:40) SOCIAL EQUALITY AND FAIRNESS 1 → Q&A IN ONLINE PLATFORMS: STACK OVERFLOW 1 → DEFECT PREDICTION: DATA ISSUES AND BUG CLASSIFICATION → FAULT LOCALIZATION 1 →			
20:00 – 21:00	08:00 – 09:00	JSEET (20:40 – 21:40) INSTITUTIONAL STRATEGIES TO SE EDUCATION I →				
21:00 – 22:00	09:00 – 10:00					

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May 27th overview

TIME CEST		Thursday, May 27 th					
LIVE	MIRROR						
10:00 – 11:00	22:00 – 23:00	Blended sessions (10:00 – 11:00)		JSEET (10:00 – 11:00)	Technical Briefing (10:00 – 11:15)		
		SOCIAL EQUALITY AND FAIRNESS 2 →					
		DEEP NEURAL NETWORKS: SUPPORTING SE TASKS 2 →					
		DEFECT PREDICTION: AUTOMATION 2 →					
		VULNERABILITIES IN ANDROID 2 →					
11:00 – 12:00	23:00 – 00:00	Panel (11:00 – 11:45)		Networking (11:00 – 11:45)	DECODING GROUNDED THEORY FOR SOFTWARE ENGINEERING →		
		ARE ACADEMICS WORKING ON THE RIGHT PROBLEMS?* →					
		* MIRROR EVENT OF PANEL MAY 25 th 20:55 – 21:40 (SCHEDULE: 11:00 – 11:45)					
		DIVERSITY & INCLUSION PANEL (MIRROR SCHEDULE ONLY: 23:00 – 23:45) →					
12:00 – 13:00	00:00 – 01:00	Blended sessions (11:50 – 13:10)		JSEET (11:50 – 12:50)	STUDENT ASSESSMENT II →		
		PROGRAMMING: CODE ANALYSIS ALGORITHMS →					
		Q&A IN ONLINE PLATFORMS: STACK OVERFLOW 2 →					
		DEFECT PREDICTION: BUG CHARACTERIZATION & ANALYSIS →					
		MUTATION TESTING: GENERAL ISSUES →					
13:00 – 14:00	01:00 – 02:00	Break 25' (13:10 – 13:35)					
		ICSE 2011 Most Influential Paper Award (13:35 – 13:45)					
		AWARDS CEREMONY →					
		Award Lecture (13:45 – 14:30)					
		LIONEL BRIAND, ANDREA ARCURI →					
14:00 – 15:00	02:00 – 03:00	Meet with (14:30 – 15:00)	Networking (14:30 – 15:00)		Demos (14:30 – 15:00)		
			COFFEE CHAT →				
			MENTORING CIRCLE (LIVE SCHEDULE ONLY) →				
			EUROPE NEEDS STRONG SOFTWARE RESEARCH (LIVE SCHEDULE ONLY) →				
			OPPORTUNITIES AT INVENIA LABS (LIVE SCHEDULE ONLY) →				
SE RESEARCH @ HUAWEI (MIRROR SCHEDULE ONLY) →							
A. ARCURI, L. BRIAND →		EVOLUTION 2 →					
15:00 – 16:00	03:00 – 04:00	Blended sessions (15:05 – 16:05)		JSEET (15:05 – 16:05)	ACM Students Research Competition (15:05 – 16:05)		
		MONITORING CLOUD-BASED SERVICES →					
		API: DEVELOPMENT →					
		PROGRAM REPAIR: AUTOMATED PATCHING →					
		TESTING: FLAKY TESTS →					
16:00 – 17:00	04:00 – 05:00	Social (16:05 – 16:25)					
		VIRTUAL TRIP TO MADRID →					
		Blended sessions (16:30 – 17:30)		JSEET (16:30 – 17:40)	ACM Students Research Competition (16:30 – 17:30)		
		DEEP NEURAL NETWORKS: DATA SELECTION →					
		SECURITY VULNERABILITIES: FROM 3RD PARTIES' CODE →					
17:00 – 18:00	05:00 – 06:00	MUTATION TESTING: MUTANT SELECTION →		JSEET KEYNOTE AND JSEET BEST PAPER AWARD →	SRC: FINAL ROUND - PRESENTATIONS 2 → (LIVE SCHEDULE ONLY)		
		OPEN SOURCE: DEVELOPERS' SKILLS →					
		Break 20' (17:30 – 17:50)					
		Other ICSE Awards (17:50 – 18:00)					
		AWARDS CEREMONY →					
18:00 – 19:00	06:00 – 07:00	Keynote (18:00 – 18:45)					
		JEANNETTE WING →					
		Meet with (18:45 – 19:15)	Networking (18:45 – 19:15)		Demos (18:45 – 19:15)		
			COFFEE CHAT →				
			MENTORING CIRCLE →				
LGBTIQ+ GROUP MEETING (LIVE SCHEDULE ONLY) →							
MEET FACEBOOK RECRUITING & RESEARCH (LIVE SCHEDULE ONLY) →		TESTING 1 →					
19:00 – 20:00	07:00 – 08:00	Blended sessions (19:20 – 20:15)			Technical Briefing (19:20 – 21:10)		
		TESTING: GENERAL ISSUES →					
		CONTINUOUS INTEGRATION, FEATURE MODELS AND PROGRAM TRANSFORMATION →					
		SECURITY VULNERABILITIES: GENERAL ISSUES 1 →					
20:00 – 21:00	08:00 – 09:00	Networking (20:15 – 20:45)		Demos (20:15 – 20:45)			
		COMMUNITY SPEED NETWORKING (LIVE SCHEDULE ONLY) →					
		YOGA AND BREATHWORKS (LIVE SCHEDULE ONLY) →					
		Blended sessions (20:50 – 21:50)				JSEET (20:50 – 21:50)	
		SECURITY VULNERABILITIES: DIFFERENT DOMAINS →					
21:00 – 22:00	09:00 – 10:00	PROGRAM REPAIR: GENERAL ISSUES →		NOVEL APPROACHES TO SE EDUCATION II →	BAYESIAN DATA ANALYSIS FOR SOFTWARE ENGINEERING →		
		FAULT LOCALIZATION 2 →					
		SECURITY VULNERABILITIES: GENERAL ISSUES 2 →					



May 28th overview

TIME CEST		Friday, May 28 th		
LIVE	MIRROR			
10:00 – 11:00	22:00 – 23:00	Blended sessions (10:00 – 10:55) OPEN SOURCE: GENERAL ISSUES → AGILE METHODS → PRIVACY IN APPS: CASES FROM COVID-19 → IMAGE PROCESSING →		JSEET (10:00 – 11:00) INSTITUTIONAL STRATEGIES TO SE EDUCATION II →
		Networking (10:55 – 11:25) TAKE A COFFEE WITH THE OPEN SCIENCE CHAIR OF ICSE 2021 (LIVE SCHEDULE ONLY) → MENTORING CIRCLE (LIVE SCHEDULE ONLY) → SE RESEARCH @ HUAWEI (LIVE SCHEDULE ONLY) → MEET FACEBOOK RECRUITING & RESEARCH (MIRROR SCHEDULE ONLY) →		Technical Briefing (11:10 – 13:00) ADVANCES IN CODE SUMMARIZATION →
		Demos (10:55 – 11:25) TESTING 2 →		
		Blended sessions (11:30 – 12:30) API: EVOLUTION AND MAINTENANCE 2 → TESTING: AUTOMATION → TESTING: 3RD PARTY SOFTWARE → FAULT LOCALIZATION 3 →		
12:00 – 13:00	00:00 – 01:00	Networking (12:30 – 13:00) MEET YOUR PEERS → ICSE IS RUNNING →		
		Break 35' (13:00 – 13:35) IEEE TCSE Harlan Mills Award (13:35 – 13:45) AWARDS CEREMONY → Award Lecture (13:45 – 14:30) DIETER ROMBACH →		
14:00 – 15:00	02:00 – 03:00	Meet with (14:30 – 15:00) DIETER ROMBACH →	Networking (14:30 – 15:00) COFFEE CHAT (LIVE SCHEDULE ONLY) → MENTORING CIRCLE (LIVE SCHEDULE ONLY) → OPPORTUNITIES AT INVENIA LABS (LIVE SCHEDULE ONLY) →	
15:00 – 16:00	03:00 – 04:00	Blended sessions (15:05 – 16:05) ANALYZING SYSTEM PROPERTIES: CORRECTNESS, DETERMINISM, REALIZABILITY → PERFORMANCE MODELING OF HIGHLY CONFIGURABLE SOFTWARE SYSTEMS → CODE REVIEW: READABILITY AND REFACTORING → CONFIGURATION OF SOFTWARE SYSTEMS: OPTIMIZATION →		JSEET (15:05 – 16:25) TEACHING SOFTWARE QUALITY II →
		Networking (16:05 – 16:35) YOGA AND BREATHWORKS (LIVE SCHEDULE ONLY) → TAKE A COFFEE WITH THE PROGRAM CO-CHAIRS OF ICSE 2022 → (LIVE SCHEDULE ONLY) ICPC (LIVE SCHEDULE ONLY) →		
		Blended sessions (16:40 – 18:00) SEIP TALKS → DEFECT PREDICTION: MODELING AND PERFORMANCE → DEVELOPERS: WELL-BEING AND PRODUCTIVITY → SOURCE CODE HISTORIES AND DOCUMENTATION →		
17:00 – 18:00	05:00 – 06:00	Break 20' (18:00 – 18:20) Other IEEE TCSE Awards (18:20 – 18:30) AWARDS CEREMONY → Town Hall (18:30 – 19:30) TOWN HALL →		Technical Briefing (15:05 – 17:20) THE SOFTWARE CHALLENGES OF BUILDING SMARTCHATBOTS →
19:00 – 20:00	07:00 – 08:00	Blended sessions (19:30 – 20:30) GAMES → PATTERNS AND SMELLS → PROGRAMMING: LOW LEVEL → OBTAINING INFORMATION FROM ISSUES AND COMMITS →		JSEET (19:30 – 20:30) TEAM PRACTICES →
		Social (20:30 – 21:00) FLAMENCO LESSON & PARTY 2 (LIVE SCHEDULE ONLY) →		
21:00 – 22:00	09:00 – 10:00	ACM SRC and SCORE (21:05 – 21:20) SRC AND SCORE AWARDS → Closing Ceremony (21:20 – 21:45) CLOSING CEREMONY →		

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On behalf of the ICSE 2021 Organizing Committee, I'm delighted to welcome you to the 43rd ACM/IEEE International Conference on Software Engineering. For the first time in its 46-year history, ICSE is to visit Spain, although, unfortunately, it has to be virtually. ICSE 2021 was originally scheduled as a physical event to take place in Madrid, Spain. The persistence of the coronavirus pandemic has, however, ruled out the possibility of holding a safe physical conference.

Despite the enormous challenges that everybody is facing during these hard pandemic times, ICSE, we are pleased to say, continues to be the premier software engineering conference with an unchanged number of submissions and an increased number of attendees.

Workshops and Co-located Events: ICSE's main conference is preceded by five days (May 17th to 21st) of nine co-located conferences and symposia (AST, CHASE, FormaliSE, ICPC, ICSSP/ICGSE, MOBILESoft, MSR, SEAMS and TechDebt) and followed by 21 workshops dealing with specific aspects of software engineering spread over a seven-day period (May 29th to June 4th).

Mentoring Events: ICSE has a tradition of mentoring its next generation of researchers through various small-group meetings between junior and established researchers. The two traditional mentoring events will each be held on two half-days prior to the main conference. The Doctoral Symposium (which provides students with constructive feedback on their PhD research) will run on May 21st and 24th, while the New Faculty Symposium (which provides guidance to new faculty members on different facets of an academic career) will be held on May 19th and 20th.

Main Conference: This year ICSE will include a four-day main conference taking place from Tuesday, May 25th, to Friday, May 28th. This year's main conference is one of the largest ever, with over 325 paper presentations. Paper presentations within the Technical, Software Engineering in Practice (SEIP), Software Engineering in Society (SEIS), New Ideas and Emerging Results (NIER) and Journal-First Tracks have been combined into blended sessions that are organized by topic rather than by track. The track on Software Engineering Education and Training (SEET) has its own topics and dedicated sessions. Technical briefings, Demonstrations, Posters and the ACM Student Research Competition will be run in parallel to the technical or networking sessions.

The technical sessions will be interlaced with social sessions to achieve, despite virtuality, ICSE's traditional role of building and consolidating our community. We will have more than 30 social/networking events (including hangouts with keynote speakers and awardees, technical and non-technical speed dating-like sessions, yoga, coffee with members of the OC, and several mentoring and minority groups support sessions).

The Technical Track received 615 paper submissions written by about 2,000 authors. Finally, 138 papers were accepted, with an acceptance rate of 22.4%. The Technical Track followed a double-blind review process in which authors were required to anonymize their submissions, and authors of accepted papers were disclosed only after all the decisions were finalized. Authors of rejected papers remained anonymous. Each paper was reviewed by at least three PC members, and the online discussion and decision was overseen by a fourth PC member who served as the moderator. Authors could read and submit a response to the reviews during the author response period. The SEIP track received 121 submissions, 41 of which were accepted. The SEIS track received 33 submissions, 11 of which were finally accepted. NIER received 81 submissions, of which 22 were accepted. SEET received 93 submissions, of which 31 were accepted.

Keynotes: I am especially pleased to welcome six distinguished keynote speakers and encourage you to attend their exciting talks, all of which (except one) will be plenary events.

- On Tuesday 14:00 CEST, Dario Gil, Senior Vice President and Director of IBM Research, will introduce us to quantum computation and IBM Quantum Experience (a platform that gives users access to a set of IBM's prototype quantum processors via the cloud). His talk also discusses Qiskit challenges like error correction and verification. Qiskit provides tools for creating and manipulating quantum programs.
- On Tuesday 18:00 CEST, Prem Devanbu, Professor at UC Davis, will give an overview of naturalness and bimodality, as two important properties of software code, highlighting creative and interesting applications of naturalness, and the promise of bimodality.
- On Wednesday 10:00 CEST, Michael R. Lyu, Choh-Ming Li Professor at the Computer Science and Engineering Department, Chinese University of Hong Kong, will discuss the critical challenges commonly seen in industrial cloud systems and propose the development of a reliability-driven AIOps (Artificial Intelligence for IT Operations) framework to achieve resilient cloud systems.
- On Wednesday 17:30 CEST, Elaine Weyuker, University Distinguished Professor at the College of Engineering and Computer Science, University of Central Florida, will discuss her ideas on good software engineering research, and proper software engineering education based on her professional experience in different roles and positions in industry and academia.
- On Thursday 18:00 CEST, Jeannette Wing, Avaneessians Director of the Data Science Institute and Professor of Computer Science at Columbia University, will invite us to ensure the responsible use of data to benefit society. In particular, she will present research activities aimed to promote Data for Good (the use of data to address societal challenges and bring in humanistic perspectives).
- On Thursday 16:40 CEST, David Garlan, Professor of Computer Science and Associate Dean for Master's Programs at the School of Computer Science at Carnegie Mellon University, will offer a talk in the context to the JSEET track. He will reflect on the role of Software Architecture in Software Engineering Education.

Awards: Some plenary sessions have been scheduled to honor the recipients of the diverse awards. In particular, the recipients of the three main ICSE awards, will offer inspiring talks for the audience:

- ICSE 2011 Most Influential Paper award has gone to Andrea Arcuri and Lionel Briand for their paper entitled *A Practical Guide for Using Statistical Tests to Assess Randomized Algorithms in Software Engineering*, addressing the key challenges of using statistical tests in software engineering. We will enjoy their talk on Thursday 13:45 CEST.
- ACM SIGSOFT Outstanding Research award has gone to Prem Devanbu for profoundly changing the way researchers think about software by exploring connections between source code and natural language. Prem was invited as a keynote speaker months before he was honored with this award. Therefore, we have designed a special style to combine both his two talks into an extended keynote address on Tuesday.
- IEEE TCSE Harlan D. Mills award has gone to Dieter Rombach in recognition of his outstanding contributions to and leadership of research, teaching, and technology transfer in the area of empirical software engineering. He will delight us with his talk on Friday 13:45 CEST.

Cultural Events: Although the physical event, which would have given you the chance to enjoy Spanish food, music, dance and more, will have to wait for better times, we have made a big effort to keep up some of our traditions, even though the virtual context is not always helpful in this respect. We have organized the usual ICSE run, albeit adapted to the virtual environment. We will be offering tidbits of Spanish culture. On Tuesday May 25th at 16:15 CEST, you will have the opportunity to enjoy a guitar micro concert (20 minutes) recorded especially for ICSE 2021 from the monumental ancient city of Caceres. On Thursday May 27th at 16:05 CEST, a couple of colleagues from the ICSE Organizing Committee will broadcast a live 20-minute walk around one of Madrid's touristic landmarks: Plaza de Oriente. Finally, we have the jewel in the crown: an online Flamenco class and party that will immerse you in the cultural experience of flamenco. This event will be organized twice to accommodate all time zones: Wednesday May 26th (12:20 CEST) and Friday 28th (20:30 CEST). The events will not be the same, and you are welcome to attend both if you can!

We have introduced several new initiatives this year regarding organization, tracks, and virtual environment.

In terms of the organization, the innovations apply to:

1. A One Role Policy, deployed at ICSE 2021 to reinforce diversity. According to this policy, nobody can participate in more than one committee, including the Organizing Committee. We would like to thank all the chairs for the big effort that they have made to roll out this policy. The results are promising, and committees (521 people) are more diverse and balanced than in previous years, including people from all continents (48% Europe; 30% North America; 11% Asia; 4.5% Oceania; 6% South America; 0.6% Africa) and a higher percentage of women (37% vs 64%).
2. This is the first ICSE to have Equity, Diversity, and Inclusion (EDI) chairs. EDI chairs oversee promoting equity, diversity, and inclusion at ICSE and ensuring that ICSE is perceived by attendees as being inclusive
3. This is also the first ICSE to reckon with a Sustainability chair. The Sustainability chair is in charge of encouraging ICSE to promote all aspects of people- and planet-related sustainability.
4. Finally, ICSE 2021 has embraced open science as a strategic goal. Open science aims to promote the transparency and availability of research outputs at ICSE, encouraging better reproducibility and replicability of studies. This year we required all authors of the main conference to upload their paper preprints. Such availability is critical in a virtual conference. We are proud that all research papers of the main conference are openly available via the conference web site. We are hugely grateful to all the authors, who self-archived, and then shared their links with us.

Some tracks have implemented innovations, all of which are detailed in their respective welcome letters. We highlight some of these key innovations below:

1. The Technical Track set up the new role of area chairs to assist the program co-chairs to handle tasks such as ensuring consistency for papers within an area and across areas. Also, this year the Technical Track has a flat structure, and the program board is not separate from the Program Committee.
2. The Journal-First Track selected papers from submissions based on a few criteria, including evident novelty with respect to already published papers, match with the established ICSE 2021 program, prospective interest

to a large portion of the ICSE audience, and whether the authors were already presenting as part of one of the other tracks at the conference.

3. The Software Engineering Education and Training (SEET) Track has joined forces with the Conference on Software Engineering Education and Training (CSEE&T) to bring you the Joint Track on Software Engineering Education and Training (JSEET). This unification offers both communities a seamless, expanded, and richer experience.

Regarding the virtual environment:

1. We will again use the Clowdr platform, with which most of you are already familiar from ICSE 2020. Clowdr was hastily developed by our ICSE community as a solution for the ICSE 2020 virtualization issue in response to the COVID-19 pandemic. The Clowdr platform has grown and improved enormously. It is now a UK community interest company and, as such, is required to reinvest almost all of its revenue into improving the platform for the good of the academic community whence it originated. By opting for the Clowdr platform, not only are we supporting the future development of Clowdr but we are also promoting an affordable solution for all academic conference organizers in these difficult times.
2. The ICSE 2021 program has been divided into a 12-hour uniform daily schedule rather than using time zones. This should guarantee a simpler, uniform structure for ICSE 2021 that is easier for conference attendees to understand and transmit the feeling of a real conference. We chose the daily 12-hour slot that maximizes the synchronous participation of the ICSE community in order to promote high interactivity. We also provide mirroring to give attendees unable to attend the live program the chance to replay and watch the entire program in the following daily 12-hour slot. In addition, some networking activities will be played live also during the mirrored program.
3. We tried to improve networking activities and imitate the face-to-face experience. Although they are obviously no substitute for a physical conference, virtual environments can enable virtual networking with people all over the globe who would otherwise be unable to attend in person. Therefore, virtuality is an opportunity to increase access to the conference for many who, even under normal circumstances, may not have been able to travel to a physical conference.
4. We have reinforced our efforts to provide support for ICSE attendees and presenters to help them adapt to the virtual environment, offering tips to promote smooth attendance.

ICSE 2021 would not happen without the tremendous effort and countless hours of unpaid work put in by members of our community. Our heartfelt gratitude goes to everyone involved, and especially to our extraordinary Organizing Committee—a team of 71 volunteers drawn from Spain and around the world—that planned a physical conference and organized a virtual event: no easy feat.

All Organizing Committee members have done a splendid job, meeting deadlines and performing their roles with prowess. We have all worked a lot harder than we ever expected. You have no idea what it is to arrange such a complex conference as ICSE, and the complications you face when the plans change half-way down the road as they did this year. The list of names is far too long to pen here, but they are omnipresent on the ICSE 2021 website.

Finally, I would also like to thank all the authors and other contributors for participating in ICSE despite the difficult times that we are going through. You are the reason why ICSE is the premier conference in software engineering.

We are excited about the great program that we have prepared! I hope that you will find lots of interesting sessions and speakers in the technical program and plenty of opportunities for discussions and networking in the social program.

Before I finish, I would like to spare a thought for any members of the ICSE community that are suffering distress due to COVID-19. We wish you and your loved ones all the best in these difficult times.

Thank you,

Natalia Juristo, General Chair, ICSE 2021

Darío Gil

**Tuesday May 25th
14:00 CEST**



What's next in software. Where will software go in the next few years? How will it be written and consumed? How is software enabling new paradigms of computation? These are some of the questions we will explore as we discuss how we are pushing the frontiers of software.

We have witnessed in recent years the power of AI applied to human language. Project Debater is the most recent example of how far AI has come to learn and reason in human language. Powerful AI models are now emerging that enable AI to create in new domains like software engineering. Just as words are the language of humans, code is the language of machines, and we are building AI that helps us master code. Imagine a future where computers program computers; and by learning, reasoning, and generating new code, AI can streamline and automate time-consuming and tedious manual IT processes, freeing up software engineers time to unleash their creativity.

We will discuss the underlying techniques enabling this future. We will see the transformative impact of AI for code, from modernizing legacy applications to intelligently managing them. Furthermore, we will see how we can ensure trust, security, and compliance in the use of AI models.

Finally, a new paradigm of computation combining physics and information—quantum computing—is emerging capable of solving problems intractable to conventional computers. The utility of a quantum computer is determined by its ability to run computationally hard quantum circuits leading to advantages in the solution of science and business problems. Software development is key to realizing this utility and extracting the benefits of quantum computing. We will discuss how software engineering is leading to a higher capacity of running circuits by speeding up the execution rate, and how it allows a wider variety of circuits to be run more efficiently to enable more applications.

DARÍO GIL - SHORT BIOGRAPHY

Dr. Darío Gil is Senior Vice President and Director of IBM Research.

As a technology and business leader, Dr. Gil is responsible for IBM Research, one of the world's largest and most influential corporate research labs, with over 3,000 researchers. He is the 12th Director in its 76-year history. Dr. Gil leads the technology roadmap and the technical community of IBM, directing innovation strategies in areas including hybrid cloud, AI, quantum computing, and exploratory science. He is also responsible for IBM's intellectual property strategy and business.

Dr. Gil is a globally recognized leader of the quantum computing industry. Under his leadership, IBM was the first company in the world to build programmable quantum computers and make them universally available through the cloud.

An advocate of collaborative research models, Dr. Gil co-chairs the MIT-IBM Watson AI Lab, which advances fundamental AI research to the broad benefit of industry and society. He also co-chairs the COVID-19 High-Performance Computing Consortium, which provides access to the world's most powerful high-performance computing resources in support of COVID-19 research.

Dr. Gil is a member of the National Science Board, the governing body of the National Science Foundation (NSF), a member of the Board of Governors of the New York Academy of Sciences, and a trustee of the New York Hall of Science.

Dr. Gil received his Ph.D. in Electrical Engineering and Computer Science from MIT.

Prem Devanbu

Tuesday May 25th
18:00 CEST



Naturalness and Bimodality of Code: A Research Overview. While natural languages are rich in vocabulary and grammatical flexibility, most human are mundane and repetitive. This repetitiveness in natural language has led to great advances in statistical NLP methods.

At UC Davis, we discovered (a decade ago) that, despite the considerable power and flexibility of programming languages, large software corpora are actually even more repetitive than NL Corpora. We went on to show that this “naturalness” of code could be captured in statistical models, and exploited within software tools. This line of work enjoyed a tremendous

boost from the high-capacity and flexibility of deep learning models. Numerous other creative and interesting applications of naturalness have ensued, from colleagues around the world. More recently, we have focused on another property of software: it is bimodal. Software is written not only to be run on machines, but also read by humans; this makes it amenable to both formal analysis, and statistical prediction. Bimodality allows new ways of training machine learning models, new ways of designing analysis algorithms, and new ways to understand the practice of programming. In this talk, I will present an overview of “Naturalness” studies, and the promise of bimodality.

PREM DEVANBU - SHORT BIOGRAPHY

Prem Devanbu received his B.Tech from IIT Madras, and a Ph.D from Rutgers University under Alex Borgida. After working in Industrial software development at Bell Laboratories and offshots in New Jersey, he joined UC Davis where he conducts teaching & research software engineering. He has won several awards for his work, including multiple best paper awards, distinguished paper awards, most influential paper awards, and test-

of-time awards. Three of his papers were invited to appear in CACM Research Highlights. He served as PC Chair of ESEC/FSE 2006 and ICSE 2010, and also as GC of MSR 2014 and ESEC/FSE 2020. He has served on the Editorial boards of ACM TOSEM, IEEE ToSE, the JSME, and the EMSE Journal; he serves currently on the CACM Editorial Board. He is an ACM Fellow. He even has his own web page.

Michael Lyu

Wednesday May 26th
10:00 CEST



Reliability-Driven AIOps for Cloud Resilience. Cloud computing platforms have recently become the main host of many IT enterprises to deploy their applications and services, such as search engine, instant messaging apps, and online shopping. As cloud systems continue to grow in terms of complexity and volume, cloud failures become inevitable, which further lead to service interruptions and performance degradation. Whether cloud failures can be properly managed will greatly affect company revenue and customer trust. Consequently, resilient cloud operations are of paramount importance to cloud vendors. However, as cloud systems are actively undergoing continuous feature upgrade and system evolution, the statistical properties of system monitoring data may change from time to time. Furthermore, there is currently a lack of means to incorporating human expert knowledge into the training of cloud data-analytics models. When diagnosing failures for large-scale systems, such knowledge is essential.

In this talk, we identify several critical challenges commonly seen in industrial cloud systems, and provide a general roadmap from fault prevention and fault removal techniques toward resilient cloud operations. We propose to develop a reliability-driven

AIOps (Artificial Intelligence for IT Operations) framework to achieving resilient cloud systems. Our goal is to improve the reliability of cloud systems and services comprehensively with AI-based data analytics, where data are collected from multiple sources of heterogeneous information such as logs, traces, and KPIs, and properly labeled with cloud domain expert's knowledge. Particularly, the framework consists of an end-to-end pipeline of software reliability engineering, including anomaly detection, failure diagnosis, and fault localization. Anomalies are events or observations that deviate significantly from a system's normal behaviors. When anomalies become severe and hinder the system from fulfilling a required function, failures occur, which often manifest themselves with human-perceivable symptoms. Failure diagnosis attempts to find the most significant problems directly induced by the failures. To achieve this objective, we explore data-driven approaches to pursue an efficient failure diagnosis from multiple perspectives of cloud systems. We investigate on what failures are caused by the anomalies underneath, which is generally indicated by a sudden increase or drop of KPIs. For example, the KPI "packet number" monitoring the cloud network may abruptly decrease because of anomalies happening in some network services. This may point to a serious failure in the network. To this end, we design an

incident aggregation procedure based on heterogeneous information fusion from incidents, topology, and fine-grained system monitoring data to identify the cascaded failures in a cloud system. Furthermore, we probe into human experts' activities to enhance the failure diagnosis procedures. Maintainers generally assign different importance of system performance to different KPIs in the cloud. To employ expert knowledge into the training of automated detection models, we introduce an adaptive failure diagnosis mechanism via human-in-the-loop, in which we systematically select informative samples for manual labeling and largely improve the performance of supervised learning algorithms. With this method, we could train a more accurate model from both historical data and human knowledge. More specifically, cloud maintainers could interact with a

serving model with minimal efforts. When false alarms and misses happen, the model can adaptively learn from them with the help of the human interaction. As a result, the model could be more accurate over time by systematically accumulating the human knowledge. Finally, we explore fault localization approaches to cluster microservice in the cloud based on logs and KPIs. We employ a PC algorithm for microservice dependency construction, and formulate a probabilistic matrix factorization algorithm for root cause recommendation. Various analytical models associated with the proposed reliability-driven AIOps framework are constructed, experimentations on real cloud data are conducted, and effectiveness of our proposed software reliability engineering techniques are demonstrated.

MICHAEL LYU - SHORT BIOGRAPHY

Prof. Michael R. Lyu is currently Choh-Ming Li Professor of the Computer Science and Engineering department in The Chinese University of Hong Kong. Prof. Lyu's research interests include software engineering, software reliability, distributed systems, cloud computing, and machine learning. He has published over 600 refereed journal and conference papers in his research areas. Prof. Lyu initiated the first International Symposium on Software Reliability Engineering (ISSRE) in 1990. He was an Associate Editor of IEEE Transactions on Reliability, IEEE Transactions on Knowledge and Data Engineering, IEEE Transactions on Services Computing, and Journal of Information Science and Engineering. He is currently on the editorial board of IEEE Access, Wiley Software Testing, Verification and

Reliability Journal (STVR), and ACM Transactions on Software Engineering Methodology (TOSEM). Prof. Lyu was elected to IEEE Fellow, AAAS Fellow, ACM Fellow, and named IEEE Reliability Society Engineer of the Year. He was granted with China Computer Federation (CCF) Overseas Outstanding Contributions Award in 2018, and the 13th Guanghua Engineering Science and Technology Award in 2020. He was also named in The AI 2000 Most Influential Scholars Annual List with three appearances in 2020.

Prof. Lyu received his B.S. in Electrical Engineering from National Taiwan University, his M.S. in Computer Science from University of California, Santa Barbara, and his Ph.D. in Computer Science from University of California, Los Angeles.

Elaine Weyuker

**Wednesday May 26th
17:30 CEST**



The View From 40 Years in the Research Trenches - From Academia to Industry and Back Again I began my career in computing as a newly graduated math major, My first post-college job was as a programmer although I'd never programmed or even seen a computer. I spent the first 3 weeks in the trenches reading a manual and learning to program and then I was unleashed on the world. After 9 months programming, I started graduate school in an Electrical Engineering Master's program, focusing on Computer Science, having never taken either an Engineering or a Computer Science course. What was I thinking?

Armed with my Master's degree, the next rung on my ladder was another industrial position, this time as a System Engineer. That lasted a year before I accepted a position in a teaching college as the sole professor of Computer Science within a general Engineering program. During my 6 years there I taught everything from Switching Theory to Mathematical Logic, beginning programming, Compilers, Operating Systems, Operations Research, and perhaps a dozen other courses. At this point it was time to go back to graduate school, get a PhD in Computer Science, and climb up a few more rungs at a research university. I spent the next 16 years as a professor at NYU doing

research in software testing, reliability, metrics and other areas of Software Engineering, although my dissertation and training were largely theoretical. While I was quite successful, publishing many papers, receiving lots of research grants and some awards, and loved teaching, I also did a fair amount of industrial consulting since I was always interested in how my ideas might impact the real world. While I had had a number of unsolicited offers to move to industry, I always thought of myself first and foremost as an academic until someone at Bell Labs convinced me to try it during a sabbatical leave. Although I got much closer to industrial practice there, I still was viewed as an outsider who gave advice, rather than an integral part of the team. After returning to NYU, I was eventually convinced to take an unpaid leave and try working for the Labs full-time as a regular member of the Technical Staff in Research. I wound up spending the next 19 years at AT&T Bell Labs and then AT&T Labs - Research as a full-time researcher who generally partnered with development projects. In 2012, AT&T was shutting down Research and I left and resumed a non-conventional academic career.

In this talk I will discuss how my different types of positions: working in industrial computing, at a teaching college, at a research university and in

industrial research have informed my ideas about good Software Engineering research, and proper Software Engineering education.

ELAINE WEYUKER - SHORT BIOGRAPHY

Elaine Weyuker is a (part-time) University Distinguished Professor, College of Engineering and Computer Science, University of Central Florida. Until the end of 2020 she was also a Part Time Visiting Professor at Mälardalen University in Västerås, Sweden. At both universities she mentors junior faculty, PhD students and post-docs, collaborates faculty, and interacts with local industrial partners. She continues to live in the US. Previously, Elaine was a Fellow and Distinguished Member of the Technical Staff at AT&T Labs and Bell Labs, a Professor of Computer Science at the Courant Institute of Mathematical Sciences of New York University, a Lecturer at the City University of New York, a Systems Engineer at IBM, and a programmer at Texaco, as well as having served as a consultant for several large international companies.

Her research expertise includes techniques and tools to improve the quality of software systems through systematic validation activities, including the development of testing, assessment and software fault prediction models. Prior to that, Elaine did research in Theory of Computation and is the co-author of a book "Computability, Complexity, and Languages". She has authored many technical papers in these fields.

Professor Weyuker is a member of the US National Academy of Engineering, an IEEE Fellow, and an ACM Fellow and has received numerous awards including IEEE's Harlan Mills Award for outstanding

software engineering research, and the ACM/SIGSOFT Outstanding Research Award.

She was the recipient of the 2011 US President's Volunteer Service Award, the 2010 ACM President's Award, the ACM SIGSOFT Retrospective Impact Paper Award in 2009, the 2008 Anita Borg Institute Technical Leadership Award, Rutgers University 50th Anniversary Outstanding Alumni Award, and the AT&T Chairman's Diversity Award as well as having been named a Woman of Achievement by the YWCA.

She was the chair of the ACM Women's Council (ACM-W) from 2004 - 2012 and continues her active participation in ACM-W. She has also been a member of the Executive Committee of the Coalition to Diversify Computing, has served on many National Academy panels, was a board member of the Computing Research Association, a member of the ACM Council, a member of the ACM/SIGSOFT Executive Board, as well as being an editor of several technical journals.

She received a BA degree in Mathematics from Harpur College, State University of New York at Binghamton, a Masters of Science in Engineering from the University of Pennsylvania, and a Ph.D. degree from Rutgers University. Professor Weyuker is a firm believer in the transformational power of education and the critical (pivotal) role that public institutions play.

Jeannette Wing

Thursday May 27th
18:00 CEST



Data for Good: Ensuring the Responsible Use of Data to Benefit Society Every field has data. We use data to discover new knowledge, to interpret the world, to make decisions, and even to predict the future. The recent convergence of big data, cloud computing, and novel machine learning algorithms and statistical methods is causing an explosive interest in data science and its applicability to all fields. This convergence has already enabled the automation of some tasks that better human performance. The novel capabilities we derive from data science will drive our cars, treat disease, and keep us safe. At the same time, such capabilities risk leading to biased, inappropriate, or unintended action. The design of data science solutions requires both excellence in the fundamentals of the field and

expertise to develop applications which meet human challenges without creating even greater risk.

The Data Science Institute at Columbia University promotes “Data for Good”: using data to address societal challenges and bringing humanistic perspectives as—not after—new science and technology is invented. Started in 2012, the Institute is now a university-level institute representing over 350 affiliated faculty from 18 different schools and institutes across campus. Data science literally touches every corner of the university.

In this talk, she will present the mission of the Institute and highlights of our educational and research activities—all with the aim of ensuring the responsible use of data to benefit society.

JEANNETTE WING - SHORT BIOGRAPHY

Jeannette M. Wing is Avaneessians Director of the Data Science Institute and Professor of Computer Science at Columbia University. From 2013 to 2017, she was a Corporate Vice President of Microsoft Research. She is Adjunct Professor of Computer Science at Carnegie Mellon University

where she twice served as the Head of the Computer Science Department and had been on the faculty since 1985. From 2007-2010 she was the Assistant Director of the Computer and Information Science and Engineering Directorate at the National Science Foundation. She received her S.B., S.M., and Ph.D.

degrees in Computer Science, all from the Massachusetts Institute of Technology.

Professor Wing's general research interests are in the areas of trustworthy computing, specification and verification, concurrent and distributed systems, programming languages, and software engineering. Her current interests are in the foundations of security and privacy, with a new focus on trustworthy AI. She was or is on the editorial board of twelve journals, including the Journal of the ACM and Communications of the ACM.

Professor Wing is known for her work on linearizability, behavioral subtyping, attack graphs, and privacy-compliance checkers. Her 2006 seminal essay, titled "Computational Thinking" is credited with helping to establish the centrality of computer science

to problem-solving in fields where previously it had not been embraced.

She is currently a member of: American Academy for Arts and Sciences Council; the Board of Trustees for the Institute of Pure and Applied Mathematics; the Advisory Board for the Association for Women in Mathematics; and the Alibaba DAMO Technical Advisory Board. She has been chair and/or a member of many other academic, government, and industry advisory boards. She received the CRA Distinguished Service Award in 2011 and the ACM Distinguished Service Award in 2014. She is a Fellow of the American Academy of Arts and Sciences, American Association for the Advancement of Science, the Association for Computing Machinery (ACM), and the Institute of Electrical and Electronic Engineers (IEEE).

David Garlan

Thursday May 27th
16:40 CEST



Reflections on the Role of Software Architecture in Software Engineering Education. Ever since software architecture emerged as a recognized subfield of software engineering in the 1990s, software engineering educational programs have attempted to integrate it into their curricula. In this talk I reflect on my own experience over the past three decades in

attempting to find effective ways to teach “architecture thinking” – specifically considering questions such as: What is worth teaching? Who needs to understand software architecture? How can architectural principles and techniques be best conveyed? How have the educational drivers for software architecture changed over time?

DAVID GARLAN - SHORT BIOGRAPHY

David Garlan a Professor of Computer Science and Associate Dean for Master’s Programs in the School of Computer Science at Carnegie Mellon University. His research interests include software architecture, self-adaptive and autonomous systems, formal methods, and cyber-physical systems. He is considered one of the founders of the field of software architecture, and, in particular, formal representation and analysis of architectural designs. He has received a Stevens Award Citation for “fundamental contributions to the

development and understanding of software architecture as a discipline in software engineering,” an Outstanding Research award from ACM SIGSOFT for “significant and lasting software engineering research contributions through the development and promotion of software architecture,” an Allen Newell Award for Research Excellence, an IEEE TCSE Distinguished Education Award, and a Nancy Mead Award for Excellence in Software Engineering Education. He is a Fellow of the IEEE and ACM.

NLP for Requirements Engineering: Tasks, Techniques, Tools, and Technologies

Alessio Ferrari CNR-ISTI, **Liping Zhao** Univ. of Manchester, **Waad Alhoshan** IMSIU

Tuesday, May 25, 15:00 CEST (75 minutes)

Requirements engineering (RE) is one of the most natural language-intensive fields within the software engineering area. Therefore, several works have been developed across the years to automate the analysis of natural language artifacts that are relevant for RE, including requirements documents, but also app reviews, privacy policies, and social media content related to software products. Furthermore, the recent diffusion of game-changing natural language processing (NLP) techniques and platforms has also boosted the interest of RE researchers. However, a reference framework to provide a holistic understanding of the field of NLP for RE is currently missing.

Based on the results of a recent systematic mapping study, and stemming from a previous ICSE tutorial by one of the authors, this technical briefing gives an overview of NLP for RE tasks, available techniques, supporting tools and NLP technologies. Part of the talk will present the concept of transfer learning, the BERT language model, and how can this be used in RE. The technical briefing is oriented to both researchers and practitioners, and will gently guide the audience towards a clearer view of how NLP can empower RE, providing pointers to representative works and specialised tools.



Alessio Ferrari is research scientist at CNR-ISTI (Consiglio Nazionale delle Ricerche - Istituto di Scienza e Tecnologia dell'Informazione) was "A. Faedo", Pisa, Italy - www.isti.cnr.it), where he works since 2011. He received his Ph.D. in Computer Engineering from the University of Florence, Italy, in 2011. His current research interests are applications of NLP techniques to RE, requirements elicitation, and RE teaching. In particular, his main focus is natural language ambiguity detection and mistakes identification in requirements elicitation interviews and requirements documents. Ferrari participated in several European Projects, including Learn PAD, ASTRail, and DESIRA. He is author of more than 70 papers in relevant conferences (RE, ICSE) and journals (REJ, EMSE, IEEE Software). He served in the PC of ICSE, IEEE RE, REFSQ, he has been co-organiser of two editions of the NLP4RE workshop, and local organiser of REFSQ 2020.



Liping Zhao is Associate Professor in the Department of Computer Science, the University of Manchester. Her current research focuses on using NLP and machine learning to support RE. From 2004 to 2014 she had been in collaboration with IBM on Pattern Language for the Design and Development E-business Applications and received three IBM Faculty Awards (2004, 2005, and 2008) for her contributions. From 2007 to 2012, she co-founded and led a multidisciplinary academic network in the UK on service science (SSMEnetUK), funded by the UK Research Council, BT, HP, and IBM. She is an Associate Editor for Requirements Engineering (Springer) and Expert Systems (Wiley). She has served on numerous conferences and workshops, and has been co-organiser of IEEE International Workshops on Requirements Patterns, co-located with RE Conference (from 2012 to 2016) and International Workshop on Advances and Applications of Problem Orientation (IWAAPPO), co-located with ICSE (2010).

Waad Alhoshan is an Assistant Professor in the Department of Computer Science, IMSIU. She received her PhD degree in Computer Science in 2020 from the University of Manchester, where she studied corpus-based and language modeling techniques to investigate approaches for detecting semantic relationships between software requirements. During her PhD, Waad published several papers in peer-reviewed conferences such as LREC, RE and ESEM. Currently, she is cooperating on multiple research projects on designing NLP-based systems to support software in Arabic and English languages. One of these projects is a collaboration project between IMSIU and the Saudi Authority for Intellectual Property (SAIP) to design AI-driven systems for processing legal documents.

Hands-On Session on the Development of Trustworthy AI software

Ville Vakkuri, Kai-Kristian Kemell, Pekka Abrahamsson, University of Jyväskylä

Tuesday, May 25, 19:35 CEST (135 minutes)

Following various real-world incidents involving both purely digital and cyber-physical Artificial Intelligence (AI) systems, AI Ethics has become a prominent topic of discussion in both research and practice, accompanied by various calls for trustworthy AI systems. AI ethics issues such as data privacy are currently highly topical. However, implementing AI ethics in practice remains a challenge for organizations. In this Hands-On technical briefing, we demonstrate

how to implement AI ethics. We showcase a method developed for this purpose, ECCOLA, which is based on academic research. ECCOLA is intended to make AI ethics more practical for developers in order to make it easier to incorporate into AI development to create trustworthy AI systems. Participants get to utilize the method in practice and get their own digital copy of ECCOLA to take home.



Ville Vakkuri. PhD candidate from Faculty of Information Technology at University of Jyväskylä, Finland. He holds a MSc in Theology with a Social Ethics major from University of Helsinki. Vakkuri's PhD research topic molds the AI community's view towards ethically designed systems by embedding ethics into software development with a new practical approach.



Kai-Kristian Kemell. PhD candidate from the Faculty of Information Technology at the University of Jyväskylä, Finland. He holds a MSc (Econ) in Information Systems (IS) and an M.A. in History. Kemell's research interests lie in software development methods, and particularly in the context of software startups, as well as AI ethics with a focus on development practices.



Pekka Abrahamsson. Professor of information systems and software engineering Head of IS Research Division, Director of Software Startuplab Member of the Finnish Academy of Science and Letters Faculty of Information Technology, University of Jyväskylä, Finland.

Reactive Synthesis with Spectra: A Tutorial

Shahar Maoz Tel Aviv University, **Jan Oliver Ringert** University of Leicester

Wednesday May 26th 14:30 CEST (135 minutes)

Reactive systems compute by ongoing interaction with their environment. Example systems include industrial robots and web applications. Spectra is a formal specification language specifically tailored for use in the context of reactive synthesis, an automated procedure to obtain a correct-by-construction reactive system from its temporal logic specification. Spectra comes with the Spectra Tools, a set of analyses, including a synthesizer to obtain a correct-by-construction implementation, several means for executing the resulting controller, and additional analyses aimed at helping engineers write higher-quality specifications. This hands-on tutorial will introduce participants to the language and the tool

set, using examples and exercises, covering an end-to-end process from specification writing to synthesis to execution. The tutorial may be of interest to software engineers and researchers who are interested in the potential applications of formal methods to software engineering.

Important: To get the most out of the hands-on tutorial, please review the following resources prior to attending:

Video: Keynote given by Shahar Maoz at FormaliSE'20: https://youtu.be/ig8_PbkGito

Download and install the Spectra IDE. For instructions: <http://smlab.cs.tau.ac.il/syntech/tutorial>



Shahar Maoz is an Associate Professor at the School of Computer Science in Tel Aviv University, where he heads the Software Modeling Laboratory. Shahar has BSc and MSc computer science degrees from Tel Aviv University, and a PhD from the Weizmann Institute, Israel. From 2010 to 2012 he was a post-doc research fellow in RWTH Aachen University, Germany, with a fellowship from the Minerva Foundation. In 2015-2016 he spent a sabbatical at MIT CSAIL. Shahar's research interests are in software engineering, specifically in the use of models and formal methods for software evolution, model inference, testing, and synthesis. His work has been published in top software engineering and modeling conferences and journals. He has served multiple times on the program committees of ASE, ESEC/FSE, ICSE, and MoDELS conferences, and will be PC co-Chair for ASE'22. He is a recipient of an ERC Starting Grant for the development of synthesis technologies (project SYNTECH: <http://smlab.cs.tau.ac.il/syntech/>).



Jan Oliver Ringert is a Lecturer at the School of Informatics at University of Leicester. Jan has a Diploma from Technical University of Brunswick and a PhD from RWTH Aachen University. From 2013 to 2015 he was a post-doc research fellow in Tel Aviv University, with a fellowship from the Minerva Foundation. From 2015 to 2018 his post-doc research was funded through the SYNTECH project. Jan's research interests are in using formal methods for model-based software engineering with applications to autonomous systems. His work has been published in top software engineering and modeling conferences and journals. Jan has co-developed and taught classes on synthesis using Spectra at Tel Aviv University. He was lead developer of the Spectra Tools from 2014 to 2018. He obtained Fellowship status from the Higher Education Academy in 2020.

Decoding Grounded Theory for Software Engineering

Rashina Hoda, Monash University

Thursday, May 27, 10:00 CEST (75 minutes)

Grounded Theory, while becoming increasingly popular in software engineering, is also one of the most misunderstood, misused, poorly presented and evaluated methods in software engineering. When applied well, GT results in dense and valuable explanations of how and why phenomena occur in practice. GT can be applied as a full research method leading to mature theories and also in limited capacity for data analysis within other methods, using its robust open coding and constant comparison procedures.

While it is difficult to provide a complete overview of GT with all its techniques and procedures in just over an hour, this technical briefing will aim to cover the following key areas:

- Origin of GT
- A brief summary of GT in software engineering – general state of practice and key challenges
- Examples of theories resulting from GT studies in SE research

- A gentle introduction to Socio-Technical Grounded Theory (STGT), a variant of GT for software engineering research

Important: To get the most out of the technical briefing, please review the following resources in advance. This will enable the briefing to have more room for open Q and A.

Resources for Preparation (please go through prior to attending)

- Paper: Hoda, R., Noble, J., & Marshall, S. (2012). Developing a grounded theory to explain the practices of self-organizing Agile teams. *Empirical Software Engineering*, 17(6), 609-639. Link to preprint: <https://tinyurl.com/yyl5j8gz>
- Video: A talk and QA with Rashina Hoda on Grounded Theory in Software Engineering, hosted by Prof Margaret-Anne Storey at the Empirical Software Engineering course, University of Victoria, Canada, 2020. Link: <https://youtu.be/z-Yr27qtePM>



Associate Professor **Rashina Hoda** is the Associate Dean (Academic Workforce) and Deputy Director of the HumaniSE Lab at Monash University, Melbourne. She is a leading international expert in the use of Grounded Theory in Software Engineering with over 15 years of experience in conducting, supervising, reviewing, and editing GT studies in SE. She is currently writing a book on the subject in contract with Springer, due for release in 2021, where she introduces Socio-Technical Grounded Theory, a variant of GT for socio-technical research. Rashina received a distinguished paper award at ICSE 2017 for her grounded theory of becoming agile and a distinguished reviewer award at ICSE 2019. In 2019-2020, Rashina contributed to the Grounded

Theory Standards as part of the ACM SIGSOFT Empirical Standards with Christoph Treude. She serves on the Organising Committee of ICSE2021, as Program co-Chair of the CHASE 2021 conference co-located at ICSE, and on the Review Board of the IEEE Transactions on Software Engineering, specialising in agile and GT research. For more, please visit: www.rashina.com

Bayesian Data Analysis for Software Engineering

Richard Torkar Chalmers and University of Gothenburg, **Carlo A. Furia**

Università della Svizzera italiana, **Robert Feldt** Chalmers University of Technology

Thursday, May 27, 19:20 CEST (110 minutes)

For over a decade now, other disciplines that heavily rely on analyzing empirical data—including medicine, psychology, economics, and marketing—have been in a sort of replication crisis. Among other things, this crisis originates in using inflexible or inadequate statistical practices to analyze small datasets collected in experiments conducted in conditions that poorly capture real-world scenarios, and are plagued by confounders that are hard to control. There is reason to believe software engineering might not be much better off. Given the broad and growing interest for statistical data analysis throughout the software engineering community, we will mainly focus on:

- limitations of the current most common statistical techniques in software engineering;
- principles underlying Bayesian data analysis;
- brief overview of the Bayesian statistical framework;
- key guidelines to apply Bayesian data analysis in practice;
- practical examples of Bayesian (re-)analysis of software engineering empirical data.

Bayesian statistics is not a silver bullet that will fix all the issues with empirical data analysis (in software engineering); but it can be an important step in the direction of helping empirical software engineering build solid foundations and achieve robust results.



Richard Torkar is a professor of software engineering at the Software Engineering Division, Chalmers and the University of Gothenburg; head of Software Engineering Division at the Department of Computer Science and Engineering; and senator at the Faculty Senate at Chalmers University of Technology. His main research interests cover both qualitative and quantitative studies, in areas such as psychology in software engineering, search-based software engineering, and software testing, with a particular focus on methods of analysis. He teaches Bayesian and frequentist statistics to bachelor, master, and Ph.D. students.



Carlo A. Furia is an associate professor at the Software Institute of USI's Faculty of Informatics. His main research interests center around developing rigorous techniques and tools to analyze and improve the quality, correctness, and reliability of software and systems. His interest in rigorous statistical practices grew out of dissatisfaction with the frustratingly counterintuitive features of frequentist statistics to analyze empirical data, and out of the fun of programming in R.



Robert Feldt is a professor of software engineering at the Software Engineering Division, Chalmers and the University of Gothenburg, and head of the Testing, Requirements, Innovation, and People (SE-TRIP) unit. He is also co-Editor in Chief of the Empirical Software Engineering (EMSE) Journal. He has broad research interests spanning from human factors to automation, statistics and machine learning, and works on software testing and quality, requirements engineering, as well as human-centered SE. Most of his research is empirical and conducted in close collaboration with industry partners.

Advances in Code Summarization

Utkarsh Desai, Giriprasad Sridhara, Srikanth Tamilselvam, IBM Research

Friday, May 28, 11:10 CEST (110 minutes)

Several studies have suggested that comments describing the code can help mitigate the burden of program understanding. However, software systems usually lack adequate comments and even when present, the comments may be obsolete or unhelpful. Researchers have addressed this issue by automatically generating comments from source code, a task referred to as Code Summarization. In this technical presentation, we take a deeper look at some of the significant, recent works in the area of code

summarization and how each of them attempts to take a new perspective of this task including methods leveraging RNNs, Transformers, Graph representation learning and Reinforcement learning. We present a background of the techniques involved and how they are leveraged to solve the problem of code summarization. We review individual methods in detail, highlight their strengths and weaknesses and discuss future avenues for this task.



Utkarsh Desai is a member of the Application Modernization team at IBM Research, India. His present work is aimed at building AI powered solutions for automated refactoring of monolith applications into microservices. His research is focused on developing source code understanding models using current advances in Deep Learning to solve problems in Code Summarization, Code Search and Application refactoring. He has also worked on Time-Series modeling, Large-scale Recommendation Systems and Text Mining systems for Social media data in the past. He completed his Masters in Intelligent Systems from The University of Texas at Dallas in 2009.



Dr. Giriprasad Sridhara is a member of the application modernization team at IBM Research Labs, India. He was among the first to address the problem of code summarization in his doctoral dissertation “Automatic Generation of Descriptive Summary Comments for Methods in Object-Oriented Programs”. He completed his Ph.D. in Computer Science from the University of Delaware, USA. His research interests span Software Engineering, Program Analysis, Machine Learning and Natural Language Processing. He has more than 20 publications in leading international conferences across the different areas. Currently, he is working on a variety of software engineering problems in the field of application modernization.



Srikanth Tamilselvam leads the application modernization research mission from India Research Labs. In this role, he is responsible for developing innovations that help IBM’s clients to effectively transition to Hybrid Cloud via refactoring. Srikanth joined IBM in 2007 and throughout his career, Srikanth has taken up challenges that aim to improve productivity of developers. His works have also been accepted in top conferences like AAAI, WWW, IJCAI, ICSOC etc. He owns 60+ US patents. For his contributions to IBM target patent portfolio, Srikanth is also recognised as a Master Inventor. Srikanth holds a master’s degree in computer science & Technology from Mysore University. His

research interests include applications of Machine Learning, Natural Language Processing and HCI. Recently, his research focus is in applying AI on code-based tasks specifically code refactoring, clustering, summarisation and code search. Srikanth also regularly conducts workshops and tutorials on topics like Machine Learning, Introduction to Deep Learning, DevOps.

The Software Challenges of Building SmartChatbots

Gwendal Daniel, Jordi Cabot

Universitat Oberta de Catalunya, Internet Interdisciplinary Institute

Friday, May 28, 15:05 CEST (135 minutes)

Chatbots are popular solutions assisting humans in multiple fields, such as customer support or e-learning. However, building such applications has become a complex task requiring a high-level of expertise in a variety of technical domains. Chatbots need to integrate (AI-based) NLU components, but also connect to internal/external services, deploy on various platforms, etc.

The briefing will first cover the current landscape of chatbot frameworks. Then, we'll get our hands dirty and create a few bots of increasing difficulty playing with aspects like entity recognition, sentiment analysis, event processing, or testing. By the end of the session, attendees will have all the keys to understand the main steps and obstacles to building a good chatbot.



Gwendal Daniel is a post-doctoral fellow in the SOM Research Lab at Internet Interdisciplinary Institute (IN3), a research center of the Universitat Oberta de Catalunya (UOC). He received his PhD degree in 2017 in the AtlanMod Team, at the Ecole des Mines de Nantes, France. He received the best thesis award from the GDR-GPL and the INFORSID association in 2018. His current research focuses on applying model-based techniques for chatbot development. He is the co-founder and CTO of Xatkit, an open-source, model-driven, chatbot development framework.



Jordi Cabot received the B.Sc. and Ph.D. degrees in computer science from the Technical University of Catalonia. He was a Leader of an INRIA and LINA Research Group at Ecole des Mines de Nantes, France, a Post-Doctoral Fellow with the University of Toronto, a Senior Lecturer with the Open University of Catalonia, and a Visiting Scholar with the Politecnico di Milano. He is currently an ICREA Research Professor at Internet Interdisciplinary Institute. His research interests include software and systems modeling, formal verification and the role AI can play in software development (and vice versa). He has published over 200 peer-reviewed conference and journal papers on these topics. Apart from his scientific publications, he writes and blogs about all these topics in several sites like modeling-languages.com and livablesoftware.com. He is also the co-founder and CEO of Xatkit, an open-source chatbot development framework.

TIME CEST		Tuesday, May 25 th		(1/11)
LIVE	MIRROR			
10:00 – 10:30	22:00 – 22:30	OPENING CEREMONY		10:00 – 10:30 22:00 – 22:30 MIRROR →
		Natalia Juristo, Arie van Deursen, Tao Xie		
10:30 – 11:30	22:30 – 23:30	BLEND ED SESSION	CODE REVIEW: AUTOMATION Chair: Antonia Bertolino	10:30 – 11:30 22:30 – 23:30 MIRROR →
		SEIP	LightSys: Lightweight and Efficient CI System for Improving Integration Speed of Software Geunsik Lim, MyungJoo Ham, Jijoong Moon, Wook Song	10:30 – 10:50
		SEIP	Using Machine Intelligence to Prioritise Code Review Requests Nishrith Saini, Ricardo Britto	10:50 – 11:10
		Technical Track	Towards Automating Code Review Activities Rosalia Tufano, Luca Pascarella, Michele Tufano, Denys Poshyvanyk, Gabriele Bavota	11:10 – 11:30
		BLEND ED SESSION	DEVELOPERS: BEHAVIOR Chair: Andrea Zisman	10:30 – 11:30 22:30 – 23:30 MIRROR →
		SEIP	A Passion for Security: Intervening to Help Software Developers Charles Weir, Ingolf Becker, Lynne Blair	10:30 – 10:50
		Technical Track	“Do this! Do that!, And nothing will happen” Do specifications lead to securely stored passwords? Joseph Hallett, Nikhil Patnaik, Benjamin Shreeve, Awais Rashid	10:50 – 11:10
		Technical Track	Why don't Developers Detect Improper Input Validation?'; DROP TABLE Papers; -- Larissa Braz, Enrico Fregnan, Gül Calikli, Alberto Bacchelli  Awarded paper: ACM SIGSOFT Distinguished Paper Award	11:10 – 11:30
		BLEND ED SESSION	DEEP NEURAL NETWORKS: VALIDATION 1 Chair: Oscar Dieste	10:30 – 11:30 22:30 – 23:30 MIRROR →
		Technical Track	Operation is the hardest teacher: estimating DNN accuracy looking for mispredictions Antonio Guerriero, Roberto Pietrantuono, Stefano Russo	10:30 – 10:50
		Technical Track	AUTOTRAINER: An Automatic DNN Training Problem Detection and Repair System Xiaoyu Zhang, Juan Zhai, Shiqing Ma, Chao Shen	10:50 – 11:10
		Technical Track	Self-Checking Deep Neural Networks in Deployment Yan Xiao, Ivan Beschastnikh, David S. Rosenblum, Changsheng Sun, Sebastian Elbaum, Yun Lin, Jin Song Dong	11:10 – 11:30



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Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th (2/11)		
LIVE	MIRROR			
10:30 – 11:30	22:30 – 23:30	BLENDED SESSION OBTAINING INFORMATION FROM APP USER REVIEWS 1 Chair: Patricia Lago	10:30 – 11:30 22:30 – 23:30 MIRROR	→
		Technical Track Identifying Key Features from App User Reviews Huayao Wu, Wenjun Deng, Xintao Niu, Changhai Nie	10:30 – 10:50	
		Technical Track CHAMP: Characterizing Undesired App Behaviors from User Comments based on Market Policies Yangyu Hu, Haoyu Wang, Tiantong Ji, Xusheng Xiao, Xiapu Luo, Peng Gao, Yao Guo	10:50 – 11:10	
		Technical Track Prioritize Crowdsourced Test Reports via Deep Screenshot Understanding Shengcheng Yu, Chunrong Fang, Zhenfei Cao, Xu Wang, Tongyu Li, Zhenyu Chen	11:10 – 11:30	
11:30 – 12:00	23:30 – 00:00	NETWORKING MEET YOUR PEERS	11:30 – 12:00 23:30 – 00:00 LIVE EVENT	→
		In this series of speed networking events, ICSE participants can meet their academic peers		
		Human aspects		
		AI and software engineering (AI for SE, SE for AI)		
		Testing		
		Program analysis		
		Open (any topic)		
		Software evolution and maintenance		
11:30 – 13:30	---	ACM SRC ACM STUDENTS RESEARCH COMPETITION: POSTER SESSION 1 Chairs: Sergio Segura, Aurora Ramírez	11:30 – 13:30 LIVE SCHEDULE ONLY	→



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TIME CEST		Tuesday, May 25 th (3/11)			
LIVE	MIRROR				
12:05 – 13:15	00:05 – 01:15	BLEND ED SESSION	DEEP NEURAL NETWORKS: VALIDATION 2 Chair: Grace Lewis	12:05 – 13:05 00:05 – 01:05 MIRROR	➔
		Technical Track	Measuring Discrimination to Boost Comparative Testing for Multiple Deep Learning Models Linghan Meng, Yanhui Li, Lin Chen, Zhi Wang, Di Wu, Yuming Zhou, Baowen Xu	12:05 – 12:25	
		Technical Track	Prioritizing Test Inputs for Deep Neural Networks via Mutation Analysis Zan Wang, Hanmo You, Junjie Chen, Yingyi Zhang, Xuyuan Dong, Wenbin Zhang	12:25 – 12:45	
		Technical Track	Testing Machine Translation via Referential Transparency Pinjia He, Clara Meister, Zhendong Su	12:45 – 13:05	
		BLEND ED SESSION	SEARCH-BASED SE & GENETIC OPERATIONS Chair: José Miguel Rojas	12:05 – 13:05 00:05 – 01:05 MIRROR	➔
		Journal First	Quality Indicators in Search-Based Software Engineering: An Empirical Evaluation Shaukat Ali, Paolo Arcaini, Dipesh Pradhan, Safdar Aqeel Safdar, Tao Yue	12:05 – 12:25	
		Journal First	Utilizing Automatic Query Reformulations as Genetic Operations to Improve Feature Location in Software Models Francisca Pérez, Tewfik Ziadi, Carlos Cetina	12:25 – 12:45	
		Technical Track	Enhancing Genetic Improvement of Software with Regression Test Selection Giovani Guizzo, Justyna Petke, Federica Sarro, Mark Harman   Awarded: Distinguished Artifact Award – Artifact	12:45 – 13:05	
		BLEND ED SESSION	DEVELOPERS: GENERAL ISSUES Chair: Oscar Pastor	12:05 – 13:15 00:05 – 01:15 MIRROR	➔
		Technical Track	Do you really code? Designing and Evaluating Screening Questions for Online Surveys with Programmers Anastasia Danilova, Alena Naiakshina, Stefan Horstmann, Matthew Smith	12:05 – 12:25	
		Technical Track	How Gamification Affects Software Developers: Cautionary Evidence from a Natural Experiment on GitHub Lukas Moldon, Markus Strohmaier, Johannes Wachs	12:25 – 12:45	
		SEIS	Exploring the Role of Creativity in Software Engineering Wouter Groeneveld, Laurens Luyten, Joost Vennekens, Kris Aerts	12:45 – 13:00	
SEIS	Résumé-Driven Development: A Definition and Empirical Characterization Jonas Fritzsche, Marvin Wyrich, Justus Bogner, Stefan Wagner	13:00 – 13:15			



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Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th			(4/11)
LIVE	MIRROR				
12:05 – 13:15	00:05 – 01:15	BLEND ED SESSION	SOFTWARE REQUIREMENTS Chair: Birgit Penzenstadler	12:05 – 13:15 00:05 – 01:15 MIRROR	→
		Technical Track	How to identify Boundary Conditions with Contrasty Metric? Weilin Luo, Hai Wan, Xiaotong Song, Binhao Yang, Hongzhen Zhong, Yin Chen	12:05 – 12:25	
		Technical Track	Using Domain-specific Corpora for Improved Handling of Ambiguity in Requirements Saad Ezzini, Sallam Abualhajja, Chetan Arora, Mehrdad Sabetzadeh, Lionel C. Briand 	12:25 – 12:45	
		SEIS	Investigating the potential impact of values on requirements and software engineering Alistair Sutcliffe, Peter Sawyer, Wei Liu, Nelly Bencomo	12:45 – 13:00	
		NIER	Validation Obligations: A Novel Approach to check Compliance between Requirements and their Formal Specification Atif Mashkoor, Michael Leuschel, Alexander Egyed	13:00 – 13:15	
		JSEET	TEACHING SOFTWARE QUALITY I Chairs: Ana Maria Moreno and Hakan Erdogmus	12:05 – 13:05 00:05 – 01:15 MIRROR	→
		JSEET	GitHub-OSS Fikit: Fixing bugs at scale in a Software Engineering Course Shin Hwei Tan, Chunfeng Hu, Ziqiang Li, Xiaowen Zhang and Ying Zhou	12:05 – 12:25	
		JSEET	Learning Software Quality Assurance with Bricks Miguel Ehécatl Morales Trujillo	12:25 – 12:45	
		JSEET	Assessing the Students' Understanding and their Mistakes in Code Review Checklists -An Experience Report of 1,791 Code Review Checklists from 394 Students Chun Yong Chong, Patanamon Thongtanunam and Chakkrit Tantithamthavorn	12:45 – 13:05	
		BREAK 30'			
13:45 – 14:45	01:45 – 02:45	AWARDS	TECHNICAL TRACK AWARDS AND ACM EUROPE COUNCIL BEST PAPER AWARD Chairs: George Eleftherakis, Arie van Deursen, Tao Xie	13:45 – 14:00 01:45 – 02:00 MIRROR	→
		KEYNOTE	DARÍO GIL Chair: Arie van Deursen Brief summary of the Keynote here	14:00 – 14:45 02:00 – 02:45 MIRROR	→
14:45 – 15:15	02:45 – 03:15	MEET WITH	MEET DARÍO GIL	14:45 – 15:15 02:45 – 03:15 MIRROR	→
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			



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Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th (5/11)			
LIVE	MIRROR				
14:45 – 15:15	02:45 – 03:15	NETWORKING	INTRODUCTION TO GATHER.TOWN Chair: Fabiano Pecorelli, Davide Fucci, Carolin Brandt	14:45 – 15:15 02:45 – 03:15 MIRROR	→
		NETWORKING	COST ACTION NETWORK ON GENDER BALANCE Chair: Valentina Lenarduzzi	14:45 – 15:15 MIRROR IN MAY 26 th (+32h) 22:45 – 23:15 MIRROR	→
		Gender balance in Informatics, are we there yet? We are working to support and to achieve gender balance. Which is your experience? Please share with us!			
		NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	14:45 – 15:15 LIVE SCHEDULE ONLY	→
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.			
		HUAWEI	SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY 02:45 – 03:15 LIVE EVENT	→
		Meeting SE Researchers at Huawei			
		POSTERS	POSTERS 1 Chair: Federica Sarro	14:45 – 15:15 02:45 – 03:15 MIRROR	→
		Each poster makes a 2-minute presentation (displayed in the Poster room). At the end of each presentation, a breakout room will be created for each poster. Attendees will be able to join and discuss with the authors.			
POSTER	Designing Tester and Sampler in Tandem Mate Soos, Priyanka Golia, Sourav Chakraborty, Kuldeep S. Meel				
POSTER	Team-oriented Consistency Checking of Heterogeneous Engineering Artifacts Michael Alexander Tröls, Atif Mashkoor, Alexander Egyed				
POSTER	RPT: Effective and Efficient Retrieval of Program Translations from Big Code Binger Chen, Ziawasch Abedjan				
15:00 – 16:15	03:00 – 04:15	TECHNICAL BRIEFING	NLP FOR REQUIREMENTS ENGINEERING: TASKS, TECHNIQUES, TOOLS, AND TECHNOLOGIES Chair: Xavier Franch	15:00 – 16:15 03:00 – 04:15 MIRROR	→
		NLP for Requirements Engineering: Tasks, Techniques, Tools, and Technologies Alessio Ferrari, Liping Zhao, Waad Alhoshan			



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Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th			(6/11)
LIVE	MIRROR				
15:20 – 16:15	03:20 – 04:15	BLEND ED SESSION	QUALITY ASSURANCE Chair: Silvia Abrahao	15:20 – 16:15 03:20 – 04:15 MIRROR	→
		Technical Track	Supporting Quality Assurance with Automated Process-Centric Quality Constraints Checking Christoph Mayr-Dorn, Michael Vierhauser, Stefan Bichler, Felix Keplinger, Jane Cleland-Huang, Alexander Egyed, Thomas Mehofer	15:20 – 15:40	
		NIER	Inconsistency-tolerating guidance for software engineering processes Christoph Mayr-Dorn, Roland Kretschmer, Alexander Egyed, Ruben Heradio, David Fernandez-Amoros	15:40 – 15:55	
		Technical Track	Understanding Bounding Functions in Safety-Critical UAV Software Xiaozhou Liang, John Henry Burns, Joseph Sanchez, Karthik Dantu, Lukasz Ziarek, Yu David Liu	15:55 – 16:15	
		BLEND ED SESSION	DEEP NEURAL NETWORKS: SUPPORTING SE TASKS 1 Chair: Ayse Tosun	15:20 – 16:15 03:20 – 04:15 MIRROR	→
		Journal First	CODIT: Code Editing with Tree-Based Neural Models Saikat Chakraborty, Yangruibo Ding, Miltiadis Allamanis, Baishakhi Ray	15:20 – 15:40	
		Technical Track	Traceability Transformed: Generating moreAccurate Links with Pre-Trained BERT Models Jinfeng Lin, Yalin Liu, Qingkai Zeng, Meng Jiang, Jane Cleland-Huang <i>Awarded paper: ACM SIGSOFT Distinguished Paper Award</i>	15:40 – 16:00	
		NIER	A Cognitive and Machine Learning-Based Software Development Paradigm Supported by Context Glaucia Melo, Paulo Alencar, Don Cowan	16:00 – 16:15	
		BLEND ED SESSION	OPEN SCIENCE Chair: Sira Vegas	15:20 – 16:15 03:20 – 04:15 MIRROR	→
		Journal First	What Makes a Popular Academic AI Repository? Yuanrui Fan, Xin Xia, David Lo, Ahmed E. Hassan, Shanping Li	15:20 – 15:40	
		Journal First	Publish or Perish, but do not Forget your Software Artifacts Robert Heumüller, Sebastian Nielebock, Jacob Krüger, Frank Ortmeier	15:40 – 16:00	
		NIER	Stop Building Castles on a Swamp! The Crisis of Reproducing Automatic Search in Evidence-based Software Engineering Zheng Li	16:00 – 16:15	



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TIME CEST		Tuesday, May 25 th			(7/11)
LIVE	MIRROR				
15:20 – 16:15	03:20 – 04:15	BLEND ED SESSION	OBTAINING INFORMATION FROM APP USER REVIEWS 2		15:20 – 16:15 03:20 – 04:15 MIRROR →
			Chair: Birgit Penzenstadler		
		SEIS	Does Culture Matter? Impact of Individualism and Uncertainty Avoidance on App Reviews		15:20 – 15:35
			Ricarda Anna-Lena Fischer, Rita Walczuch, Emitzá Guzmán		
		Technical Track	Automatically Matching Bug Reports With Related App Reviews		15:35 – 15:55
			Marlo Haering, Christoph Stanik, Walid Maalej		
		Technical Track	It Takes Two to Tango: Combining Visual and Textual Information for Detecting Duplicate Video-Based Bug Reports		15:55 – 16:15
			Nathan Cooper, Carlos Bernal-Cárdenas, Oscar Chaparro, Kevin Moran, Denys Poshyvanyk		
16:15 – 16:35	04:15 – 04:35	SOCIAL	GUITAR CONCERT		16:15 – 16:35 04:15 – 04:35 MIRROR →
			A live guitar micro concert (20 minutes) broadcasted by a colleague from the SE group at the Caceres University from the monumental ancient city of Caceres.		
16:40 – 17:35	04:40 – 05:35	BLEND ED SESSION	VARIABILITY AND PRODUCT LINES		16:40 – 17:35 04:40 – 05:35 MIRROR →
			Chair: Joanne M. Atlee		
		NIER	Bridging the Gap Between Clone-and-Own and Software Product Lines		16:40 – 16:55
			Timo Kehrer, Thomas Thüm, Alexander Schultheiß, Paul Maximilian Bittner		
		Technical Track	Seamless Variability Management With the Virtual Platform		16:55 – 17:15
			Wardah Mahmood, Daniel Strüber, Thorsten Berger, Ralf Laemmel, Mukelabai Mukelabai		
		SEIP	Challenges of Implementing Software Variability in Eclipse OMR: An Interview Study		17:15 – 17:35
			Batyr Nuryyev, Sarah Nadi, Nazim Bhuiyan, Leonardo Banderali		
		BLEND ED SESSION	CONTINUOUS INTEGRATION		16:40 – 17:35 04:40 – 05:35 MIRROR →
			Chair: Daniela Damian		
		Journal First	A Machine Learning Approach to Improve the Detection of CI Skip Commits		16:40 – 17:00
			Rabe Abdalkareem, Suhaib Mujahid, Emad Shihab		
		Technical Track	What helped, and what did not? An Evaluation of the Strategies to Improve Continuous Integration		17:00 – 17:20
			Xianhao Jin, Francisco Servant		
		NIER	ADEPT: A Socio-Technical Theory of Continuous Integration		17:20 – 17:35
			Omar Elazhary, Margaret-Anne Storey, Neil Ernst, Elise Paradis		



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Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th (8/11)		
LIVE	MIRROR			
16:40 – 17:35	04:40 – 05:35	BLEND ED SESSION	IDENTIFYING INFORMATION LEAKS Chair: Oscar Dieste	16:40 – 17:35 04:40 – 05:35 MIRROR →
		NIER	An Axiomatic Approach to Detect Information Leaks in Concurrent Programs Sandip Ghosal, R.K. Shyamasundar	16:40 – 16:55
		Technical Track	Abacus: Precise Side-Channel Analysis Qinkun Bao, Zihao Wang, Xiaoting Li, James Larus, Dinghao Wu	16:55 – 17:15
		Technical Track	Data-Driven Synthesis of a Provably Sound Side Channel Analysis Jingbo Wang, Chungha Sung, Mukund Raghothaman, Chao Wang	17:15 – 17:35
		BLEND ED SESSION	DEVELOPERS: ONBOARDING Chair: Gail Murphy	16:40 – 17:35 04:40 – 05:35 MIRROR →
		SEIP	Please Turn Your Cameras On: Remote Onboarding of Software Developers during a Pandemic Paige Rodeghero, Thomas Zimmermann, Brian Houck, Denae Ford	16:40 – 17:00
		NIER	Exploring the Efficiency of Self-Organizing Software Teams with Game Theory Clay Stevens, Jared Soundy, Hau Chan	17:00 – 17:15
		Technical Track	A Case Study of Onboarding in Software Teams: Tasks and Strategies An Ju, Hitesh Sajnani, Scot Kelly, Kim Herzig	17:15 – 17:35
		BREAK 15'		
				17:35 – 17:50 05:35 – 05:50 MIRROR
17:50 – 19:00	05:50 – 07:00	AWARDS	ACM SIGSOFT OUTSTANDING RESEARCH AWARD Chair: Thomas Zimmermann	17:50 – 18:00 05:50 – 06:00 MIRROR →
		KEYNOTE + AWARD LECTURE	PREM DEVANBU Chair: Thomas Zimmermann	18:00 – 19:00 06:00 – 07:00 MIRROR →
		Naturalness and Bimodality of Code: A Research Overview Brief summary of the Keynote here		
19:00 – 19:30	07:00 – 07:30	MEET WITH	MEET PREM DEVANBU	19:00 – 19:30 07:00 – 07:30 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		

Detailed Program: May 25th

TIME CEST		Tuesday, May 25 th (9/11)		
LIVE	MIRROR			
19:00 – 19:30	07:00 – 07:30	NETWORKING	COMMUNITY SPEED NETWORKING	19:00 – 19:30 LIVE SCHEDULE ONLY →
		In this series of speed networking events, ICSE participants can meet their peers. Speed Networking: Hablamos Español		
		NETWORKING	COFFEE CHAT	19:00 – 19:30 07:00 – 07:30 LIVE EVENT →
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.		
		Women in Software Engineering Research		(19:00 – 19:30 and 07:00 – 07:30)
		Μιλάμε ελληνικά Eleni Constantinou		(19:00 – 19:30 ONLY)
		Falamos português! Igor Steinmacher		(19:00 – 19:30 ONLY)
		On parle français Fabio Petrillo		(19:00 – 19:30 ONLY)
		Parliamo italiano Valentina Lenarduzzi		(19:00 – 19:30 ONLY)
		Blacks in Software Engineering		(19:00 – 19:30 ONLY)
		Hablamos español José Miguel Rojas		(07:00 – 07:30 ONLY)
		NETWORKING	ICSE IS RUNNING Chairs: Luís Cruz, Ayushi Rastogi	19:00 – 19:30 07:00 – 07:30 MIRROR →
		The first-ever virtual run event at ICSE! From 25-27, May 2021 AOE attendees from all over the world will run 5 km. Join us! #ICSE21isRunning		
		INVENIA LABS	OPPORTUNITIES AT INVENIA LABS	19:00 – 19:30 LIVE SCHEDULE ONLY →
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.		
19:00 – 21:15	---	POSTERS	POSTERS 2 Chair: Davide Fucci	19:00 – 19:30 07:00 – 07:30 MIRROR →
		Each poster makes a 2-minute presentation (displayed in the Poster room). At the end of each presentation, a breakout room will be created for each poster. Attendees will be able to join and discuss with the authors.		
		POSTER	Finding Metamorphic Relations for Scientific Software Xuanyi Lin, Zedong Peng, Nan Niu, Wentao Wang, Hui Liu	
		POSTER	Understanding Language Selection in Multi-Language Software Projects on GitHub Wen Li, Na Meng, Li Li, Haipeng Cai	
		POSTER	We'll Fix It in Post: What Do Bug Fixes in Video Game Update Notes Tell Us? Andrew Truelove, Eduardo Santana de Almeida, Iftekhar Ahmed	
19:00 – 21:15	---	ACM SRC	ACM STUDENTS RESEARCH COMPETITION: POSTER SESSION 2 Chairs: Aurora Ramírez, Sergio Segura	19:00 – 21:00 LIVE SCHEDULE ONLY →
		SCORE	SCORE FINALISTS Chairs: Sarah Beecham, Patanamon Thongtanunam, Igor Steinmacher, Fabio Calefato	19:00 – 21:15 LIVE SCHEDULE ONLY →



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TIME CEST		Tuesday, May 25 th (10/11)		
LIVE	MIRROR			
19:35 – 20:55	07:35 – 08:55	BLEND ED SESSION	DEEP NEURAL NETWORKS: GENERAL ISSUES Chair: Ignacio Panach	19:35 – 20:55 07:35 – 08:55 MIRROR →
		SEIP	Asset Management in Machine Learning: A Survey Samuel Idowu, Daniel Strüber, Thorsten Berger	19:35 – 19:55
		Technical Track	An Empirical Study of Refactorings and Technical Debt in Machine Learning Systems Yiming Tang, Raffi Khatchadourian, Mehdi Bagherzadeh, Rhia Singh, Ajani Stewart, Anita Raja	19:55 – 20:15
		Journal First	Logram: Efficient Log Parsing Using n-Gram Dictionaries Hetong Dai, Heng Li, Che-Shao Chen, Weiyi Shang, Tse-Hsun (Peter) Chen	20:15 – 20:35
		Technical Track	DeepLocalize: Fault Localization for Deep Neural Networks Mohammad Wardat, Wei Le, Hridesh Rajan	20:35 – 20:55
		BLEND ED SESSION	DEVELOPERS: OBSERVATIONAL STUDIES Chair: Carolyn Seaman	19:35 – 20:55 07:35 – 08:55 MIRROR →
		Journal First	What Leads to a Confirmatory or Disconfirmatory Behaviour of Software Testers? Ifaah Salman, Pilar Rodriguez, Burak Turhan, Ayse Tosun, Arda Gureller	19:35 – 19:55
		SEIP	An interview study of how developers use execution logs in embedded software engineering Nan Yang, Pieter Cuijpers, Ramon Schiffelers, Johan Lukkien, Alexander Serebrenik	19:55 – 20:15
		Technical Track	Relating Reading, Visualization, and Coding for New Programmers: A Neuroimaging Study Madeline Endres, Zachary Karas, Xiaosu Hu, Ioulia Kovelman, Westley Weimer	20:15 – 20:35
		Journal First	Explicit Programming Strategies Thomas LaToza, Maryam Arab, Dastyni Loksa, Amy Ko	20:35 – 20:55
		BLEND ED SESSION	API: USAGE AND REFACTORING Chair: Giuseppe Scanniello	19:35 – 20:55 07:35 – 08:55 MIRROR →
		SEIP	Automatically Identifying Parameter Constraints in Complex Web APIs: A Case Study at Adyen Henk Grent, Aleksei Akimov, Maurício Aniche	19:35 – 19:55
		Technical Track	SOAR: A Synthesis Approach for Data Science API Refactoring Ansong Ni, Daniel Ramos, Aidan Z.H. Yang, Ines Lynce, Vasco Manquinho, Ruben Martins, Claire Le Goues  	19:55 – 20:15
		Journal First	Studying Ad Library Integration Strategies of Top Free-to-Download Apps Md Ahasanuzzaman, Safwat Hassan, Ahmed E. Hassan	20:15 – 20:35
		Technical Track	Are Machine Learning Cloud APIs Used Correctly? Chengcheng Wan, Shicheng Liu, Henry Hoffmann, Michael Maire, Shan Lu 	20:35 – 20:55



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TIME CEST		Tuesday, May 25 th				(11/11)
LIVE	MIRROR					
19:35 – 20:55	07:35 – 08:55	BLEND ED SESSION	OPEN SOURCE: PARTICIPANTS' MOTIVATIONS Chair: Gregorio Robles		19:35 – 20:55 07:35 – 08:55 MIRROR	→
		Technical Track	Leaving My Fingerprints: Motivations and Challenges of Contributing to OSS for Social Good Yu Huang, Denae Ford, Thomas Zimmermann		19:35 – 19:55	
		Journal First	Studying the Association between Bountysource Bounties and the Issue-addressing Likelihood of GitHub Issue Reports Jiayuan Zhou, Shaowei Wang, Cor-Paul Bezemer, Ying Zou, Ahmed E. Hassan		19:55 – 20:15	
		Technical Track	Onboarding vs. Diversity, Productivity and Quality -- Empirical Study of the OpenStack Ecosystem Armstrong Foundjem, Ellis E. Eghan, Bram Adams  		20:15 – 20:35	
		Technical Track	The Shifting Sands of Motivation: Revisiting What Drives Contributors in Open Source Marco Gerosa, Igor Scaliante Wiese, Bianca Trinkenreich, Georg Link, Gregorio Robles, Christoph Treude, Igor Steinmacher, Anita Sarma		20:35 – 20:55	
		BLEND ED SESSION	DEVELOPERS: NAMING METHODS AND VARIABLES Chair: José Miguel Rojas		19:35 – 20:55 07:35 – 08:55 MIRROR	→
		Journal First	How Developers Choose Names Dror Feitelson, Ayelet Mizrahi, Nofar Noy, Aviad Ben Shabat, Or Eliyahu, Roy Sheffer		19:35 – 19:55	
		Technical Track	IdBench: Evaluating Semantic Representations of Identifier Names in Source Code Yaza Wainakh, Moiz Rauf, Michael Pradel		19:55 – 20:15	
		Technical Track	A Context-based Automated Approach for Method Name Consistency Checking and Suggestion Yi Li, Shaohua Wang, Tien N. Nguyen		20:15 – 20:35	
		Technical Track	On the Naming of Methods: A Survey of Professional Developers Reem S. Alsuhaibani, Christian D. Newman, Michael J. Decker, Michael L. Collard, Jonathan I. Maletic  		20:35 – 20:55	
19:35 – 21:50	07:35 – 09:50	TECHNICAL BRIEFING	HANDS-ON SESSION ON THE DEVELOPMENT OF TRUSTWORTHY AI SOFTWARE Chair: Grace Lewis		19:35 – 21:50 07:35 – 09:50 MIRROR	→
		Hands-On Session on the Development of Trustworthy AI software Ville Vakkuri, Kai-Kristian Kemell, Pekka Abrahamsson				
20:55 – 21:40	08:55 – 09:40	PANEL	ARE ACADEMICS WORKING ON THE RIGHT PROBLEMS? Chairs: David C. Shepherd, Davide Falessi		20:55 – 21:40 THURSDAY 27TH 11:00 – 11:45 (MIRROR)	→
		Felienne Hermans, Titus Barik, Nachiappan Nagappan				
		PANEL	PASS THE MIC: SUSTAINABILITY FROM AROUND THE GLOBE Chairs: Birgit Penzenstadler		MIRROR SCHEDULE ONLY 08:55 – 09:40 LIVE EVENT	→
Champika Ellawala, Chao Mbogo, Yuri Castro						



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TIME CEST		Wednesday, May 26 th (1/13)		
LIVE	MIRROR			
10:00 – 10:45	22:00 – 22:45	KEYNOTE	MICHAEL LYU: Chair: Tao Xie	10:00 – 10:45 22:00 – 22:45 MIRROR →
		Reliability-Driven AIOps for Cloud Resilience Brief summary of the Keynote here		
		MEET WITH	MEET MICHAEL LYU	10:45 – 11:15 22:45 – 23:15 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		
		NETWORKING	COFFEE CHAT	10:45 – 11:15 22:45 – 23:15 LIVE EVENT →
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.		
		Women in Software Engineering Research		
		Hablamos español		
10:45 – 11:15	22:45 – 23:15	NETWORKING	MENTORING CIRCLE Chair: Abhik Roychoudhury	10:45 – 11:15 LIVE SCHEDULE ONLY →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	10:45 – 11:15 LIVE SCHEDULE ONLY →
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.		
		INVENIA LABS	OPPORTUNITIES AT INVENIA LABS	10:45 – 11:15 LIVE SCHEDULE ONLY →
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.		
		FACEBOOK	MEET FACEBOOK RECRUITING & RESEARCH	MIRROR SCHEDULE ONLY 22:45 – 23:15 LIVE EVENT →
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook		



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TIME CEST		Wednesday, May 26 th			(2/13)
LIVE	MIRROR				
10:45 – 11:15	22:45 – 23:15	DEMOS	EVOLUTION 1 Chair: Giuseppe Scanniello	10:45 – 11:15 22:45 – 23:15 MIRROR	→
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.			
		DEMO	MigrationAdvisor: Recommending Library Migrations from Large-Scale Open-Source Data Hao He, Yulin Xu, Xiao Cheng, Guangtai Liang, Minghui Zhou		
		DEMO	AndroEvolve: Automated Update for Android Deprecated-API Usages Stefanus Agus Haryono, Ferdian Thung, David Lo, Lingxiao Jiang, Julia Lawall, Hong Jin Kang, Lucas Serrano, Gilles Muller		
		DEMO	GraphGallery: A Platform for Fast Benchmarking and Easy Development of Graph Neural Networks Based Intelligent Software Jintang Li, Kun Xu, Liang Chen, Zibin Zheng, Xiao Liu		
		DEMO	BLOCKEYE: Hunting For DeFi Attacks on Blockchain Bin Wang, Han Liu, Chao Liu, Zhiqiang Yang, Qian Ren, Huixuan Zheng, Hong Lei		
11:20 – 12:20	23:20 – 00:20	DEMO	APIScanner - Towards Automated Detection of Deprecated APIs in Python Libraries Aparna Vadlamani, Rishitha Kalicheti, Sridhar Chimalakonda		
		BLENDEN SESSION	VULNERABILITIES IN ANDROID 1 Chair: Alessandra Gorla	11:20 – 12:20 23:20 – 00:20 MIRROR	→
		Technical Track	Fine with "1234"? An Analysis of SMS One-Time Password Randomness in Android Apps Siqu Ma, Juanru Li, hyoungshick kim, Elisa Bertino, Surya Nepal, Diet Ostry, Cong Sun	11:20 – 11:40	
		Technical Track	App's Auto-Login Function Security Testing via Android OS-Level Virtualization Wenna Song, Jiang Ming, Lin Jiang, Han Yan, Yi Xiang, Yuan Chen, Jianming Fu, Guojun Peng	11:40 – 12:00	
		Technical Track	ATVHunter: Reliable Version Detection of Third-Party Libraries for Vulnerability Identification in Android Apps Xian Zhan, Lingling Fan, Sen Chen, Feng Wu, Tianming Liu, Xiapu Luo, Yang Liu <i>Awarded paper: ACM SIGSOFT Distinguished Paper Award</i>	12:00 – 12:20	
		BLENDEN SESSION	DEEP NEURAL NETWORKS: QUALITY ASSURANCE Chair: Gregorio Robles	11:20 – 12:20 23:20 – 00:20 MIRROR	→
		Technical Track	Graph-based Fuzz Testing for Deep Learning Inference Engines Weisi Luo, Xiaoyue Run, Dong Chai, Jiang Wang, Chunrong Fang, Zhenyu Chen	11:20 – 11:40	
		Technical Track	RobOT: Robustness-Oriented Testing for Deep Learning Systems Jingyi Wang, Jialuo Chen, Youcheng Sun, Xingjun Ma, Dongxia Wang, Jun Sun, Peng Cheng	11:40 – 12:00	
		Technical Track	Scalable Quantitative Verification For Deep Neural Networks Teodora Baluta, Zheng Leong Chua, Kuldeep S. Meel, Prateek Saxena	12:00 – 12:20	



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TIME CEST		Wednesday, May 26 th			(3/13)
LIVE	MIRROR				
11:20 – 12:20	23:20 – 00:20	BLEND ED SESSION	MODEL CHECKING Chair: Oscar Dieste	11:20 – 12:20 23:20 – 00:20 MIRROR	→
		Journal First	Adversarial Specification Mining Hong Jin Kang, David Lo	11:20 – 11:40	
		Technical Track	Fast Parametric Model Checking through Model Fragmentation Xinwei Fang, Radu Calinescu, Simos Gerasimou, Faisal Alhwikem	11:40 – 12:00	
		Technical Track	Trace-Checking CPS Properties: Bridging the Cyber-Physical Gap Claudio Menghi, Enrico Viganò, Domenico Bianculli, Lionel Briand  	12:00 – 12:20	
		BLEND ED SESSION	TOOLS FOR THE PYTHON LANGUAGE Chair: Igor Steinmacher	11:20 – 12:20 23:20 – 00:20 MIRROR	→
		Technical Track	Restoring Execution Environments of Jupyter Notebooks Jiawei Wang, Li Li, Andreas Zeller	11:20 – 11:40	
		Technical Track	PyART: Python API Recommendation in Real-Time Xincheng He, Lei Xu, Xiangyu Zhang, Rui Hao, Yang Feng, Baowen Xu 	11:40 – 12:00	
		Technical Track	PyCG: Practical Call Graph Generation in Python Vitalis Salis, Thodoris Sotiropoulos, Panos Louridas, Diomidis Spinellis, Dimitris Mitropoulos  	12:00 – 12:20	
		BLEND ED SESSION	CODE REVIEW: OBSERVATIONAL STUDIES Chair: Sira Vegas	11:20 – 12:20 23:20 – 00:20 MIRROR	→
		Journal First	Review Dynamics and Their Impact on Software Quality Patanamon Thongtanunam, Ahmed E. Hassan	11:20 – 11:40	
12:20 – 12:50	---	Journal First	Code Reviews with Divergent Review Scores: An Empirical Study of the OpenStack and Qt Communities Toshiki Hirao, Shane McIntosh, Akinori Ihara, Kenichi Matsumoto	11:40 – 12:00	
		Journal First	A Longitudinal Study of Static Analysis Warning Evolution and the Effects of PMD on Software Quality in Apache Open Source Projects Alexander Trautsch, Steffen Herbold, Jens Grabowski	12:00 – 12:20	
		SOCIAL	FLAMENCO LESSON & PARTY 1	12:20 – 12:50 LIVE SCHEDULE ONLY	→
An online Flamenco class and party that will immerse you in the cultural experience of flamenco Read here to start preparing yourself for clapping and castanets (https://www.ishowusevilla.com/en).					



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TIME CEST		Wednesday, May 26 th			(4/13)
LIVE	MIRROR				
12:55 – 13:55	00:55 – 01:55	BLEND ED SESSION	MODULARIZATION AND REUSABILITY Chair: Maria Teresa Baldassarre	12:55 – 13:55 00:55 – 01:55 MIRROR	→
		Technical Track	CENTRIS: A Precise and Scalable Approach for Identifying Modified Open-Source Software Reuse Seunghoon Woo, Sunghan Park, Seulbae Kim, Heejo Lee, Hakjoo Oh	12:55 – 13:15	
		Technical Track	Interpretation-enabled Software Reuse Detection Based on a Multi-Level Birthmark Model Xi Xu, Qinghua Zheng, Zheng Yan, Ming Fan, Ang Jia, Ting Liu	13:15 – 13:35	
		SEIP	Search-Based Software Re-Modularization: A Case Study at Adyen Casper Schröder, Adriaan van der Feltz, Annibale Panichella, Maurício Aniche	13:35 – 13:55	
		BLEND ED SESSION	CONFIGURATION OF SOFTWARE SYSTEMS: TESTING Chair: Antonia Bertolino	12:55 – 13:55 00:55 – 01:55 MIRROR	→
		Technical Track	An Evolutionary Study of Configuration Design and Implementation in Cloud Systems Yuanliang Zhang, Haochen He, Owolabi Legunsen, Shanshan Li, Wei Dong, Tianyin Xu 	12:55 – 13:15	
		Technical Track	AutoCCAG: An Automated Approach to Constrained Covering Array Generation Chuan Luo, Jinkun Lin, Shaowei Cai, Xin Chen, Bing He, Bo Qiao, Pu Zhao, Qingwei Lin, Hongyu Zhang, Wei Wu, Saravanakumar Rajmohan, Dongmei Zhang	13:15 – 13:35	
		SEIP	ConfigFix: Interactive Configuration Conflict Resolution for the Linux Kernel Patrick Franz, Thorsten Berger, Ibrahim Fayaz, Sarah Nadi, Evgeny Groshev	13:35 – 13:55	
		BLEND ED SESSION	GUI DESIGN Chair: Ignacio Panach	12:55 – 13:55 00:55 – 01:55 MIRROR	→
		Journal First	Wireframe-based UI Design Search through Image Autoencoder Jieshan Chen, Chunyang Chen, Zhenchang Xing, Xin Xia, Liming Zhu, John Grundy, Jinshui Wang	12:55 – 13:15	
		Technical Track	GUIGAN: Learning to Generate GUI Designs Using Generative Adversarial Networks Tianming Zhao, Chunyang Chen, Yuanning Liu, Xiaodong Zhu	13:15 – 13:35	
		Technical Track	Don't Do That! Hunting Down Visual Design Smells in Complex UIs against Design Guidelines Bo Yang, Zhenchang Xing, Xin Xia, Chunyang Chen, Deheng Ye, Shanping Li	13:35 – 13:55	



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TIME CEST		Wednesday, May 26 th		(5/13)	
LIVE	MIRROR				
12:55 – 13:55	00:55 – 01:55	Blended Session	PROGRAMMING: GENERAL ISSUES	12:55 – 13:55	→
		Chair: Gregorio Robles			
		Technical Track	Efficient Compiler Autotuning via Bayesian Optimization	12:55 – 13:15	
		Junjie Chen, Ningxin Xu, Peiqi Chen, Hongyu Zhang			
		Technical Track	TransRegex: Multi-modal Regular Expression Synthesis by Generate-and-Repair	13:15 – 13:35	
		Yeting Li, Shuaimin Li, Zhiwu Xu, Jialun Cao, Zixuan Chen, Yun Hu, Haiming Chen, Shing-Chi Cheung			
		Technical Track	EvoSpex: An Evolutionary Algorithm for Learning Postconditions	13:35 – 13:55	
		Facundo Molina, Pablo Ponzio, Nazareno Aguirre, Marcelo F. Frias			
					
		Blended Session	DEEP NEURAL NETWORKS: HACKING	12:55 – 13:55	→
		Chair: Grace Lewis			
		SEIP	Robustness of on-device Models: Adversarial Attack to Deep Learning Models on Android Apps	12:55 – 13:15	
Yujin Huang, Han Hu, Chunyang Chen					
Technical Track	DeepBackdoor: Black-box Backdoor Attack on Deep Learning Models through Neural Payload Injection	13:15 – 13:35			
Yuanchun Li, Jiayi Hua, Haoyu Wang, Chunyang Chen, Yunxin Liu					
Technical Track	Reducing DNN Properties to Enable Falsification with Adversarial Attacks	13:35 – 13:55			
David Shriver, Sebastian Elbaum, Matthew B Dwyer					
 					
JSEET	TEACHING SE IN REAL CONTEXTS		12:55 – 13:55	→	
Chair: Ana María Moreno					
JSEET	Teaching the Scrum Master Role using Professional Agile Coaches and Communities of Practice		12:55 – 13:15		
Maria Paasivaara					
JSEET	Teaching Model-based Requirements Engineering to Industry Professionals: An Experience Report		13:15 – 13:35		
Marian Daun, Jennifer Brings, Marcel Goger, Walter Koch and Thorsten Weyer					
Awarded paper: Best Paper - Joint Track for Software Engineering Education and Training (JSEET)					
JSEET	Supporting Real Demands in Software Engineering with a Four Steps Project-Based Learning Approach		13:35 – 13:55		
Leonardo Humberto Silva, Renata Xavier Castro and Marice Costa Guimaraes					
BREAK 35'				13:55 – 14:30	
				01:55 – 02:30 MIRROR	



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TIME CEST		Wednesday, May 26 th			(6/13)
LIVE	MIRROR				
14:30 – 15:30	02:30 – 03:30	BLEND ED SESSION	DEFECT PREDICTION: AUTOMATION 1 Chair: Carolyn Seaman	14:30 – 15:30 02:30 – 03:30 MIRROR	→
		Technical Track	Automatic Web Testing using Curiosity-Driven Reinforcement Learning Yan Zheng, Yi Liu, Xiaofei Xie, Yepang Liu, Lei Ma, Jianye Hao, Yang Liu	14:30 – 14:50	
		Technical Track	Evaluating SZZ Implementations Through a Developer-informed Oracle Giovanni Rosa, Luca Pascarella, Simone Scalabrino, Rosalia Tufano, Gabriele Bavota, Michele Lanza, Rocco Oliveto	14:50 – 15:10	
		SEIP	D2A: A Dataset Built for AI-Based Vulnerability Detection Methods Using Differential Analysis Yunhui Zheng, Saurabh Pujar, Burn Lewis, Luca Buratti, Edward Epstein, Bo Yang, Jim A. Laredo, Alessandro Morari, Zhong Su	15:10 – 15:30	
		BLEND ED SESSION	SELF-ADMITTED TECHNICAL DEBT Chair: Mika Mäntylä	14:30 – 15:30 02:30 – 03:30 MIRROR	→
		Journal First	Wait For It: Identifying “On-Hold” Self-Admitted Technical Debt Rungraj Maipradit, Christoph Treude, Hideaki Hata, Kenichi Matsumoto	14:30 – 14:50	
		Journal First	An Exploratory Study on the Introduction and Removal of Different Types of Technical Debt Jiakun Liu, Qiao Huang, Xin Xia, Emad Shihab, David Lo, Shanping Li	14:50 – 15:10	
		Journal First	Identifying Self-Admitted Technical Debts with Jitterbug Zhe Yu, Fahmid Morshed Fahid, Huy Tu, Tim Menzies	15:10 – 15:30	
		BLEND ED SESSION	SOFTWARE LOG ANALYSIS Chair: Silverio Martínez-Fernández	14:30 – 15:25 02:30 – 03:25 MIRROR	→
		Technical Track	Semi-supervised Log-based Anomaly Detection via Probabilistic Label Estimation Lin Yang, Junjie Chen, Zan Wang, Weijing Wang, Jiajun Jiang, Xuyuan Dong, Wenbin Zhang  	14:30 – 14:50	
		Technical Track	DeepLV: Suggesting Log Levels Using Ordinal Based Neural Networks Zhenhao Li, Heng Li, Tse-Hsun (Peter) Chen, Weiyi Shang	14:50 – 15:10	
		NIER	On Automatic Parsing of Log Records Jared Rand, Andriy Miranskyy	15:10 – 15:25	



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TIME CEST		Wednesday, May 26 th			(7/13)
LIVE	MIRROR				
14:30 – 15:30	02:30 – 03:30	BLEND ED SESSION	SMART CONTRACTS Chair: Oscar Pastor	14:30 – 15:30 02:30 – 03:30 MIRROR	→
		Journal First	Defining Smart Contract Defects on Ethereum Jiachi Chen, Xin Xia, David Lo, John Grundy, Xiapu Luo, Ting Chen	14:30 – 14:50	
		Technical Track	Smart Contract Security: a Practitioners' Perspective Zhiyuan Wan, Xin Xia, David Lo, Jiachi Chen, Xiapu Luo, Xiaohu Yang  	14:50 – 15:10	
		Journal First	An exploratory study of smart contracts in the Ethereum blockchain platform Gustavo Ansaldi Oliva, Ahmed E. Hassan, Zhen Ming (Jack) Jiang	15:10 – 15:30	
		BLEND ED SESSION	HANDLING ECOSYSTEMS OF FORKED PROJECTS Chair: Claudia Ayala	14:30 – 15:25 02:30 – 03:25 MIRROR	→
		Technical Track	Same File, Different Changes: The Potential of Meta-Maintenance on GitHub Hideaki Hata, Raula Gaikovina Kula, Takashi Ishio, Christoph Treude  	14:30 – 14:50	
		NIER	Semi-Automated Test-Case Propagation in Fork Ecosystems Mukelabai Mukelabai, Thorsten Berger, Paulo Borba	14:50 – 15:05	
		Technical Track	Can Program Synthesis be Used to Learn Merge Conflict Resolutions? An Empirical Analysis Rangeet Pan, Vu Le, Nachiappan Nagappan, Sumit Gulwani, Shuvendu Lahiri, Mike Kaufman	15:05 – 15:25	
		TECHNICAL BRIEFING	REACTIVE SYNTHESIS WITH SPECTRA: A TUTORIAL Chair: Xavier Franch	14:30 – 16:45 02:30 – 04:45 MIRROR	→
		Reactive Synthesis with Spectra: A Tutorial Shahar Maoz, Jan Oliver Ringert			
15:30 – 16:00	03:30 – 04:00	NETWORKING	MEET YOUR PEERS	15:30 – 16:00 03:30 – 04:00 LIVE EVENT	→
		In this series of speed networking events, ICSE participants can meet their academic peers			
		Postdoctoral researchers			
		PhD students			
		Faculty			
		NETWORKING	AST INDUSTRIAL COMPETITION	15:30 – 16:00 LIVE SCHEDULE ONLY	→
		This year the theme for AST is "Automatic Software Testing from the Trenches". In order to visualize the industrial orientation of the congress, an "industrial competition" for participants of AST 2021 will be organized. The idea is to give a very short presentation of accepted papers in AST to an industrial commission (only 3 to 5 minutes per author!) and they will select a winner analyzing its attractiveness to the industry.			



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Detailed Program: May 26th

TIME CEST		Wednesday, May 26 th			(8/13)
LIVE	MIRROR				
15:30 – 16:00	03:30 – 04:00	NETWORKING		MENTORING CIRCLE	15:30 – 16:00 →
		Chair: Jonathan Bell (<i>LIVE SCHEDULE</i>), Gail Murphy (<i>MIRROR SCHEDULE</i>)		03:30 – 04:00 LIVE EVENT	
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.			
		HUAWEI		SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY →
				03:30 – 04:00 LIVE EVENT	
		Meeting SE Researchers at Huawei			
16:05 – 17:05	04:05 – 05:05	BLENDED SESSION		FUZZING	16:05 – 17:05 →
				Chair: Hakan Erdogmus	04:05 – 05:05 MIRROR
		Technical Track	Input Algebras Rahul Gopinath, Hamed Nemati, Andreas Zeller		16:05 – 16:25
			 		
		Technical Track	Fuzzing Symbolic Expressions Luca Borzacchiello, Emilio Coppa, Camil Demetrescu		16:25 – 16:45
		Technical Track	Growing A Test Corpus with Bonsai Fuzzing Vasudev Vikram, Rohan Padhye, Koushik Sen		16:45 – 17:05
		BLENDED SESSION		API: EVOLUTION AND MAINTENANCE 1	16:05 – 17:05 →
				Chair: Davide Falessi	04:05 – 05:05 MIRROR
		Technical Track	Semantic Patches for Adaptation of JavaScript Programs to Evolving Libraries Benjamin Barslev Nielsen, Martin Toldam Torp, Anders Møller		16:05 – 16:25
					
		Journal First	An Empirical Study of Dependency Downgrades in the npm Ecosystem Filipe R. Cogo, Gustavo Ansal di Oliva, Ahmed E. Hassan		16:25 – 16:45
		Journal First	A3: Assisting Android API Migrations Using Code Examples Maxime Lamothe, Weiyi Shang, Tse-Hsun (Peter) Chen		16:45 – 17:05
		BLENDED SESSION		OBSERVATIONAL STUDIES: DIFFERENT DOMAINS	16:05 – 17:00 →
				Chair: Daniela Damian	04:05 – 05:00 MIRROR
		NIER	Two Elements of Pair Programming Skill Franz Zieris, Lutz Prechelt		16:05 – 16:20
		Journal First	The best laid plans or lack thereof: Security decision-making of different stakeholder groups Benjamin Shreeve, Joseph Hallett, Matthew Edwards, Kopo M. Ramokapane, Richard Atkins, Awais Rashid		16:20 – 16:40
		SEIP	On the Lack of Consensus Among Technical Debt Detection Tools Jason Lefever, Yuanfang Cai, Humberto Cervantes, Rick Kazman, Hongzhou Fang		16:40 – 17:00



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TIME CEST		Wednesday, May 26 th (9/13)				
LIVE	MIRROR					
16:05 – 17:00	04:05 – 05:00	Blended Session	MODELS AND DSLS Chair: Joanne M. Atlee	16:05 – 17:00 04:05 – 05:00 MIRROR	→	
		Journal First	Efficient execution of ATL model transformations using static analysis and parallelism Jesús Sánchez Cuadrado, Loli Burgueño, Manuel Wimmer, Antonio Vallecillo	16:05 – 16:25		
		NIER	Towards Domain-Specific Modelling Environments based on Augmented Reality Léa Brunschwig, Rubén Campos-López, Esther Guerra, Juan de Lara	16:25 – 16:40		
		Journal First	Execution of Partial State Machine Models Mojtaba Bagherzadeh, Nafiseh Kahani, Karim Jahed, Juergen Dingel	16:40 – 17:00		
BREAK 15'				17:05 – 17:20 05:05 – 05:20 MIRROR		
17:20 – 18:15	05:20 – 06:15	Awards	Other ACM SIGSOFT Awards Chair: Thomas Zimmermann	17:20 – 17:30 05:20 – 05:30 MIRROR	→	
		Keynote	ELAINE WEYUKER: Chair: Oscar Dieste	17:30 – 18:15 05:30 – 06:15 MIRROR	→	
The View From 40 Years in the Research Trenches - From Academia to Industry and Back Again Brief summary of the Keynote here						
18:00 – 21:05	---	Industry Case Studies	SPANISH INDUSTRY CASE STUDIES Chairs: Andrés-Leonardo Martínez-Ortiz, Aurora Barrero López	18:00 – 21:10 LIVE SCHEDULE ONLY	→	
		Opening	Aurora Barrero López, Andrés-Leonardo Martínez-Ortiz	18:00 – 18:10		
		Talk	Contributions to an open source project: Igalia and the Chromium project Mario Sánchez - Pradalgalia, S.L.	18:10 – 18:35		
		Talk	From counting potatos to help organizations understand open source software engineering José Manrique López de la Fuente - Bitergia	18:35 – 19:00		
		Talk	Challenges of building a Telco in the cloud Pablo Moncada	19:00 – 19:25		
		Talk	Cybersecurity and Interoperability for IoT constrained networks in Smart Agriculture Rafael Marín Pérez	19:25 – 19:50		
		Talk	How Me2B can improve your search and discovery experience Pieter Vegt	19:50 – 20:15		
		Talk	Developing infrastructure with Software Engineering principles Javier Provecho - Telefonica	20:15 – 20:40		
		Talk	Managing scalability in a spatiotemporal data environment Miguel Ángel Corella Montoya	20:40 – 21:05		
		Closing	Aurora Barrero López, Andrés-Leonardo Martínez-Ortiz	21:05 – 21:10		



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Detailed Program: May 26th

TIME CEST		Wednesday, May 26 th (10/13)		
LIVE	MIRROR			
18:15 – 18:45	06:15 – 06:45	MEET WITH	MEET ELAINE WEYUKER	18:15 – 18:45 06:15 – 06:45 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		
		NETWORKING	COFFEE CHAT	18:15 – 18:45 06:15 – 06:45 LIVE EVENT →
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.		
		Women in Software Engineering Research		
		Hablamos español		
		Blacks in Software Engineering		
		NETWORKING	WAIN'21 – 1 st WORKSHOP ON AI ENGINEERING – SOFTWARE ENGINEERING FOR AI Chair: Ivica Crnkovic	18:15 – 18:45 LIVE SCHEDULE ONLY →
		WAIN'21 has brought researchers and practitioners in software engineering, data-science, and AI, to build up a community which is targeting new challenges emerging in software engineering – how to efficiently build software AI-enabled software systems.		
		NETWORKING	YOU MIGHT BE STUDYING TECHNICAL DEBT AND NOT KNOW IT Chair: Antonio Martini	18:15 – 18:45 LIVE SCHEDULE ONLY →
		NETWORKING	MENTORING CIRCLE Chair: Tao Xie	MIRROR SCHEDULE ONLY 06:15 – 06:45 LIVE EVENT →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		FACEBOOK	FACEBOOK LAUNCHES NEW RESEARCH AWARD OPPORTUNITY	18:15 – 18:45 LIVE SCHEDULE ONLY →
		Join us for the launch of a research award opportunity for academia at ICSE! This request for proposals continues the research that the probability team at Facebook, led by Mark Harman, is doing to foster innovation in agent-based user interaction simulation.		
		DEMOS	VERIFICATION Chair: Francisco Servant	18:15 – 18:45 06:15 – 06:45 MIRROR →
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.		
		DEMO	Metrinome: Path Complexity Predicts Symbolic Execution Path Explosion Gabriel Bessler, Josh Cordova, Shaheen Cullen-Baratloo, Sofiane Dissem, Emily Lu, Ibrahim Abughararh, Sofia Devin, Lucas Bang	
		DEMO	Roosterize: Suggesting Lemma Names for Coq Verification Projects Using Deep Learning Pengyu Nie, Karl Palmskog, Junyi Jessy Li, Milos Gligoric	
		DEMO	NEUROSPF: A Tool For the Symbolic Analysis of Neural Networks Muhammad Usman, Yannic Noller, Corina S. Pasareanu, Youcheng Sun, Divya Gopinath	



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TIME CEST		Wednesday, May 26 th			(11/13)
LIVE	MIRROR				
18:50 – 19:50	06:50 – 07:50	BLEND ED SESSION	TESTING: AUTOMATIC TEST GENERATION Chair: José Miguel Rojas	18:50 – 19:50 06:50 – 07:50 MIRROR	→
		Journal First	Inputs from Hell: Learning Input Distributions for Grammar-Based Test Generation Ezekiel Soremekun, Esteban Pavese, Nikolas Havrikov, Lars Grunske, Andreas Zeller	18:50 – 19:10	
		Technical Track	Automatic Unit Test Generation for Machine Learning Libraries: How Far Are We? Song Wang, Nishtha Shrestha, Abarna Kucheri Subburaman, Junjie Wang, Moshi Wei, Nachiappan Nagappan	19:10 – 19:30	
		Journal First	Using Relative Lines of Code to Guide Automated Test Generation for Python Josie Holmes, Iftekhar Ahmed, Caius Brindescu, Rahul Gopinath, He Zhang, Alex Groce	19:30 – 19:50	
		BLEND ED SESSION	DEVELOPERS: EXPERIMENTS Chair: Sira Vegas	18:50 – 19:50 06:50 – 07:50 MIRROR	→
		Technical Track	The Mind Is a Powerful Place: How Showing Code Comprehensibility Metrics Influences Code Understanding Marvin Wyrich, Andreas Preikschat, Daniel Graziotin, Stefan Wagner	18:50 – 19:10	
		Technical Track	Program Comprehension and Code Complexity Metrics: An fMRI Study Norman Peitek, Sven Apel, Chris Parnin, André Brechmann, Janet Siegmund   Awarded paper: ACM SIGSOFT Distinguished Paper Award	19:10 – 19:30	
		Journal First	Comparing Block-based Programming Models for Two-armed Robots Nico Ritschel, Vladimir Kovalenko, Reid Holmes, Ronald Garcia, David C. Shepherd	19:30 – 19:50	
		BLEND ED SESSION	CODE COMPLETION Chair: Marsha Chechik	18:50 – 19:50 06:50 – 07:50 MIRROR	→
		Technical Track	Siri, Write the Next Method Fengcai Wen, Emad Aghajani, Csaba Nagy, Michele Lanza, Gabriele Bavota	18:50 – 19:10	
		Technical Track	Code Prediction by Feeding Trees to Transformers Seohyun Kim, Jinman Zhao, Yuchi Tian, Satish Chandra	19:10 – 19:30	
		SEIP	Learning Autocompletion from Real-World Datasets Gareth Aye, Seohyun Kim, Hongyu Li	19:30 – 19:50	



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TIME CEST		Wednesday, May 26 th			(12/13)
LIVE	MIRROR				
18:50 – 19:50	06:50 – 07:50	BLEND ED SESSION	SOME BIG COMPANIES' PRACTICES: CASES AT FACEBOOK, GOOGLE & IBM Chair: Davide Falesi	18:50 – 19:50 06:50 – 07:50 MIRROR	→
		SEIP	Testing Web Enabled Simulation at Scale Using Metamorphic Testing Mark Harman, John Ahlgren, Maria Eugenia Berezin, Elena Dulskyte, Inna Dvortsova, Johann George, Natalija Gucevska, Erik Meijer, Justin Spahr-Summers, Kinga Bojarczuk, Silvia Sapora, Maria Lomeli	18:50 – 19:10	
		SEIP	Anomaly Detection in a Large-scale Cloud Platform Mohammad Saiful Islam, William Pourmajidi, Lei Zhang, John Steinbacher, Tony Erwin, Andriy Miranskyy	19:10 – 19:30	
		SEIP	Smart Build Targets Batching Service at Google Kaiyuan Wang, Daniel Rall, Greg Tener, Vijay Gullapalli, Xin Huang, Ahmed Gad	19:30 – 19:50	
19:50 – 20:35	07:50 – 08:35	PANEL	WHAT IS A NIER PAPER IN SOFTWARE ENGINEERING? Chairs: Patricia Lago, Gail Murphy	19:50 – 20:35 07:50 – 08:35 MIRROR	→
Ivica Crnkovic, Paris Avgeriou, Liliana Pasquale, Antonia Bertolino					
20:40 – 21:40	08:40 – 09:40	BLEND ED SESSION	SOCIAL EQUALITY AND FAIRNESS 1 Chair: Joanne M. Atlee	20:40 – 21:40 08:40 – 09:40 MIRROR	→
		SEIP	Evolving Software to be ML-Driven Utilizing Real-World A/B Testing: Experiences, Insights, Challenges Paul Luo Li, Xiaoyu Chai, Frederick Campbell, Jilong Liao, Neeraja Abburu, Minsuk Kang, Irina Niculescu, Greg Brake, Siddharth Patel, James Dooley, Brandon Paddock	20:40 – 21:00	
		Technical Track	AID: An Automated Inclusivity-Bug Detector Amreeta Chatterjee, Mariam Guizani, Catherine Stevens, Jillian Emard, Mary Evelyn May, Margaret Burnett, Iftekhar Ahmed, Anita Sarma	21:00 – 21:20	
		SEIP	Towards Inclusive Software Engineering Through A/B Testing: A Case-Study at Windows Irina Niculescu, Huibin Mary Hu, Christina Gee, Chewy Chong, Shivam Dubey, Paul Luo Li	21:20 – 21:40	
		BLEND ED SESSION	Q&A IN ONLINE PLATFORMS: STACK OVERFLOW 1 Chair: Francisco Servant	20:40 – 21:40 08:40 – 09:40 MIRROR	→
		Journal First	Reading Answers on Stack Overflow: Not Enough! Haoxiang Zhang, Shaowei Wang, Tse-Hsun (Peter) Chen, Ahmed E. Hassan	20:40 – 21:00	
		Journal First	An Empirical Study of Developer Discussions in the Gitter Platform Osama Ehsan, Safwat Hassan, Mariam El Mezouar, Ying Zou	21:00 – 21:20	
		Technical Track	Automatic Extraction of Opinion-based Q&A from Online Developer Chats Preetha Chatterjee, Kostadin Damevski, Lori Pollock	21:20 – 21:40	



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Detailed Program: May 26th

TIME CEST		Wednesday, May 26 th (13/13)			
LIVE	MIRROR				
20:40 – 21:40	08:40 – 09:40	BLENDED SESSION	DEFECT PREDICTION: DATA ISSUES AND BUG CLASSIFICATION Chair: Federica Sarro	20:40 – 21:40 08:40 – 09:40 MIRROR	→
		Technical Track	Early Life Cycle Software Defect Prediction. Why? How? Shrikanth N C, Suvodeep Majumder, Tim Menzies	20:40 – 21:00	
		Journal First	On the Time-Based Conclusion Stability of Cross-Project Defect Prediction Models Abdul Ali Bangash, Hareem Sahar, Abram Hindle, Karim Ali	21:00 – 21:20	
		Technical Track	IoT Bugs and Development Challenges Amir Makhshari, Ali Mesbah	21:20 – 21:40	
		BLENDED SESSION	FAULT LOCALIZATION 1 Chair: Leonardo Mariani	20:40 – 21:40 08:40 – 09:40 MIRROR	→
		SEIP	Industry-scale IR-based Bug Localization: A Perspective from Facebook Vijayaraghavan Murali, Lee Gross, Rebecca Qian, Satish Chandra	20:40 – 21:00	
			Awarded paper: IEEE Software Distinguished Paper Award - Software Engineering in Practice		
		Technical Track	FLACK: Counterexample-Guided Fault Localization for Alloy Models Guolong Zheng, ThanhVu Nguyen, Simón Gutiérrez Brida, Germán Regis, Marcelo F. Frias, Nazareno Aguirre, Hamid Bagheri	21:00 – 21:20	
		Technical Track	Improving Fault Localization by Integrating Value and Predicate Based Causal Inference Techniques Yigit Kucuk, Tim A. D. Henderson, Andy Podgurski	21:20 – 21:40	
			Awarded paper: ACM SIGSOFT Distinguished Paper Award		
JSEET	INSTITUTIONAL STRATEGIES TO SE EDUCATION I Chair: Hakan Erdogmus	20:40 – 21:40 08:40 – 09:40 MIRROR	→		
JSEET	Structuring a Comprehensive Software Security Course Around the OWASP Application Security Verification Standard Sarah Elder, Nusrat Zahan, Val Kozarev, Tim Menzies, Rui Shu and Laurie Williams	20:40 – 21:00			
JSEET	Exponential Competence of Computer Science and Software Engineering Undergraduate Students Orit Hazzan	21:00 – 21:20			
JSEET	"Is My Mic On?" Preparing SE Students for Collaborative Remote Work and Hybrid Team Communication Makayla Moster, Denae Ford and Paige Rodeghero	21:20 – 21:40			



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TIME CEST		Thursday, May 27 th			(1/14)
LIVE	MIRROR				
10:00 – 11:00	22:00 – 23:00	BLEND ED SESSION	SOCIAL EQUALITY AND FAIRNESS 2 Chair: Alexander Serebrenik	10:00 – 10:55 22:00 – 22:55 MIRROR	→
		SEIS	A First Look at Human Values-Violation in App Reviews Humphrey Obie, Waqar Hussain, Xin Xia, John Grundy, Li Li, Burak Turhan, Jon Whittle, Mojtaba Shahin	10:00 – 10:15	
		Technical Track	Ignorance and Prejudice in Software Fairness Jie M. Zhang, Mark Harman	10:15 – 10:35	
		Journal First	Gender Differences in Personality Traits of Software Engineers Daniel Russo, Klaas-Jan Stol	10:35 – 10:55	
		BLEND ED SESSION	DEEP NEURAL NETWORKS: SUPPORTING SE TASKS 2 Chair: Sira Vegas	10:00 – 11:00 22:00 – 23:00 MIRROR	→
		SEIP	NNStreamer: Efficient and Agile Development of On-Device AI Systems MyungJoo Ham, Jijoong Moon, Geunsik Lim, Jaeyun Jung, Hyoungjoo Ahn, Wook Song, Sangjung Woo, Parichay Kapoor, Dongju Chae, Gichan Jang, Yongjoo Ahn, Jihoon Lee	10:00 – 10:20	
		Journal First	Deep Learning Based Program Generation from Requirements Text: Are We There Yet? Hui Liu, Mingzhu Shen, Jiaqi Zhu, Nan Niu, Ge Li, Lu Zhang	10:20 – 10:40	
		Technical Track	Studying the Usage of Text-To-Text Transfer Transformer to Support Code-Related Tasks Antonio Mastropaolo, Simone Scalabrino, Nathan Cooper, David Nader Palacio, Denys Poshyvanyk, Rocco Oliveto, Gabriele Bavota	10:40 – 11:00	
		BLEND ED SESSION	DEFECT PREDICTION: AUTOMATION 2 Chair: Robert Feldt	10:00 – 11:00 22:00 – 23:00 MIRROR	→
		Journal First	Revisiting Supervised and Unsupervised Methods for Effort-Aware Cross-Project Defect Prediction Chao Ni, Xin Xia, David Lo, Xiang Chen, Qing Gu	10:00 – 10:20	
		Journal First	Ammonia: an Approach for Deriving Project-Specific Bug Patterns Yoshiki Higo, Shinpei Hayashi, Hideaki Hata, Mei Nagappan	10:20 – 10:40	
		Journal First	Predicting Defective Lines Using a Model-Agnostic Technique Supatsara Wattanakriengkrai, Patanamon Thongtanunam, Chakkrit Tantithamthavorn, Hideaki Hata, Kenichi Matsumoto	10:40 – 11:00	



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th (2/14)			
LIVE	MIRROR				
10:00 – 11:00	22:00 – 23:00	BLEND ED SESSION	VULNERABILITIES IN ANDROID 2 Chair: Ignacio Panach	10:00 – 11:00 22:00 – 23:00 MIRROR	→
		Technical Track	JUSTGen: Effective Test Generation for Unspecified JNI Behaviors on JVMs Sungjae Hwang, Sungho Lee, Jihoon Kim, Sukyoung Ryu  	10:00 – 10:20	
		Journal First	Why an Android App is Classified as Malware? Towards Malware Classification Interpretation Bozhi Wu, Sen Chen, Cuiyun Gao, Lingling Fan, Yang Liu, Weiping Wen, Michael Lyu	10:20 – 10:40	
		Journal First	Security Analysis of Permission Re-delegation Vulnerabilities in Android Apps Biniam Fisseha Demissie, Mariano Ceccato, Lwin Khin Shar	10:40 – 11:00	
		JSEET	STUDENT ASSESSMENT I Chair: Ana María Moreno	10:00 – 11:00 22:00 – 23:00 MIRROR	→
		JSEET	Effectiveness of Peer Review in Teaching and Learning User Centered Conceptual Design Among Large Cohorts of Information Technology Students Farshid Anvari, Hien Minh Thi Tran and Deborah Richards	10:00 – 10:20	
		JSEET	Reforming Assessment: Challenges Beyond Design Laura Tubino, Jean-Guy Schneider, Andrew Cain, Dhananjay Thiruvady and Chathu Ranaweera	10:20 – 10:40	
		JSEET	Gradeer: An Open-Source Modular Hybrid Grader Benjamin Clegg, Maria-Cruz Villa-Uriol, Phil McMinn and Gordon Fraser	10:40 – 11:00	
10:00 – 11:15	22:00 – 23:15	TECHNICAL BRIEFING	DECODING GROUNDED THEORY FOR SOFTWARE ENGINEERING Chair: Xavier Franch	10:00 – 11:15 22:00 – 23:15 MIRROR	→
		Decoding Grounded Theory for Software Engineering Rashina Hoda			
11:00 – 11:45	23:00 – 23:45	PANEL	ARE ACADEMICS WORKING ON THE RIGHT PROBLEMS?*	11:00 – 11:45 LIVE SCHEDULE ONLY	→
		Felienne Hermans, Titus Barik, Nachiappan Nagappan * Mirror event of Panel given in May 25th			
		PANEL	DIVERSITY & INCLUSION PANEL Chairs: Emerson Murphy-Hill, Margaret-Anne Storey, Yu Huang	MIRROR SCHEDULE ONLY 23:00 – 23:45 MIRROR	→
		Brittany Johnson, Alannah Oleson, Alexander Serebrenik, Stephanie Forrest			
11:00 – 11:30	---	NETWORKING	TAKE A COFFEE WITH THE PROGRAM CO-CHAIRS OF ICSE 2021	11:00 – 11:45 LIVE SCHEDULE ONLY	→
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!			



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TIME CEST		Thursday, May 27 th			(3/14)
LIVE	MIRROR				
11:50 – 13:10	23:50 – 01:10	BLEND ED SESSION	PROGRAMMING: CODE ANALYSIS ALGORITHMS Chair: Giuseppe Scanniello	11:50 – 13:10 23:50 – 01:10 MIRROR	→
		Technical Track	A Differential Testing Approach for Evaluating Abstract Syntax Tree Mapping Algorithms Yuanrui Fan, Xin Xia, David Lo, Ahmed E. Hassan, Yuan Wang, Shanping Li	11:50 – 12:10	
		Technical Track	InferCode: Self-Supervised Learning of Code Representations by Predicting Subtrees Nghì D. Q. Bui, Yijun Yu, Lingxiao Jiang	12:10 – 12:30	
		Journal First	Modular Tree Network for Source Code Representation Learning Wenhan Wang, Ge Li, Sijie Shen, Xin Xia, Zhi Jin	12:30 – 12:50	
		SEIP	Case Study on Data-driven Deployment of Program Analysis on an Open Tools Stack Anton Ljungberg, David Åkerman, Emma Söderberg, Gustaf Lundh, Jon Sten, Luke Church	12:50 – 13:10	
		BLEND ED SESSION	Q&A IN ONLINE PLATFORMS: STACK OVERFLOW 2 Chair: Alexander Serebrenik	11:50 – 13:10 23:50 – 01:10 MIRROR	→
		Journal First	Technical Q&A Site Answer Recommendation via Question Boosting Zhipeng Gao, Xin Xia, David Lo, John Grundy	11:50 – 12:10	
		Technical Track	Automated Query Reformulation for Efficient Search Based on Query Logs from Stack Overflow Kaibo Cao, Chunyang Chen, Sebastian Baltes, Christoph Treude, Xiang Chen <i>Awarded paper: ACM SIGSOFT Distinguished Paper Award</i>	12:10 – 12:30	
		Technical Track	Automatic Solution Summarization for Crash Bugs Haoye Wang, Xin Xia, David Lo, John Grundy, Xinyu Wang	12:30 – 12:50	
		Journal First	Chatbot4QR: Interactive Query Refinement for Technical Question Retrieval Neng Zhang, Qiao Huang, Xin Xia, Ying Zou, David Lo, Zhenchang Xing	12:50 – 13:10	
		BLEND ED SESSION	DEFECT PREDICTION: BUG CHARACTERIZATION & ANALYSIS Chair: Robert Feldt	11:50 – 13:05 23:50 – 01:05 MIRROR	→
		Journal First	Watch out for Extrinsic Bugs! A Case Study of their Impact in Just-In-Time Bug Prediction Models on the OpenStack project Gema Rodríguez-Pérez, Mei Nagappan, Gregorio Robles	11:50 – 12:10	
		Journal First	An Empirical Study of Model-Agnostic Techniques for Defect Prediction Models Jirayus Jiarpakdee, Chakkrit Tantithamthavorn, Hoa Khanh Dam, John Grundy	12:10 – 12:30	
		Journal First	On the cost and profit of software defect prediction Steffen Herbold	12:30 – 12:50	
		NIER	Software Ticks Need No Specifications Christoph Reichenbach	12:50 – 13:05	



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th			(4/14)
LIVE	MIRROR				
11:50 – 13:05	23:50 – 01:05	BLEND ED SESSION	MUTATION TESTING: GENERAL ISSUES Chairs: Sigrid Eldh	11:50 – 13:05 23:50 – 01:05 MIRROR	→
		Journal First	Sentinel: A Hyper-Heuristic for the Generation of Mutant Reduction Strategies Giovani Guizzo, Federica Sarro, Jens Krinke, Silvia Regina Vergilio	11:50 – 12:10	
		NIER	What Are We Really Testing in Mutation Testing for Machine Learning? A Critical Reflection Annibale Panichella, Cynthia C. S. Liem	12:10 – 12:25	
		Technical Track	MuDelta: Delta-Oriented Mutation Testing at Commit Time Wei Ma, Thierry Titchou Chekam, Mike Papadakis, Mark Harman	12:25 – 12:45	
		Technical Track	Does mutation testing improve testing practices? Goran Petrović, Marko Ivanković, Gordon Fraser, René Just	12:45 – 13:05	
		JSEET	STUDENT ASSESSMENT II Chair: Ana María Moreno	11:50 – 12:50 23:50 – 00:50 MIRROR	→
		JSEET	Grading 600+ students: A Case Study on Peer and Self Grading Maurício Aniche, Frank Mulder and Felienne Hermans	11:50 – 12:10	
		JSEET	Enhancing the Learning of Database Access Programming using Continuous Integration and Aspect Oriented Programming Beatriz Pérez	12:10 – 12:30	
		JSEET	Mutation testing and self/peer assessment: analyzing their effect on students in a software testing course Pedro Delgado-Pérez, Inmaculada Medina-Bulo, Miguel Ángel Álvarez-García and Kevin J. Valle-Gómez	12:30 – 12:50	
		BREAK 25'			13:10 – 13:35 01:10 – 01:35 MIRROR
13:35 – 14:30	01:35 – 02:30	AWARDS	ICSE 2011 MOST INFLUENTIAL PAPER AWARD Chairs: Harald Gall, Nenad Medvidović	13:35 – 13:45 01:35 – 01:45 MIRROR	→
		AWARD LECTURE	LIONEL BRIAND, ANDREA ARCURI	13:45 – 14:30 01:45 – 02:30 MIRROR	→
		A Practical Guide for Using Statistical Tests to Assess Randomized Algorithms in Software Engineering			
14:30 – 15:00	02:30 – 03:00	MEET WITH	MEET ANDREA ARCURI, LIONEL BRIAND	14:30 – 15:00 02:30 – 03:00 MIRROR	→
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2011? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th			(5/14)
LIVE	MIRROR				
14:30 – 15:00	02:30 – 03:00	NETWORKING	COFFEE CHAT	14:30 – 15:00 02:30 – 03:00 LIVE EVENT	→
		<p>If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.</p> <p>Women in Software Engineering Research</p> <p>Hablamos español</p>			
		NETWORKING	MENTORING CIRCLE Chair: Patricia Lago	14:30 – 15:00 LIVE SCHEDULE ONLY	→
		<p>ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.</p>			
		NETWORKING	EUROPE NEEDS STRONG SOFTWARE RESEARCH Chair: Alexander Serebrenik	14:30 – 15:00 LIVE SCHEDULE ONLY	→
		<p>Software Engineering research is under-funded and many of us need to apply to programs targeting other topics such as cybersecurity, AI and blockchain. Joins us in requesting international and national funding agencies to acknowledge the importance of software for society and the need for increased funding of software research.</p> <p>Alexander Serebrenik, Paris Avgeriou, Jurgen Vinju, Marieke Huisman</p>			
		INVENIA	OPPORTUNITIES AT INVENIA LABS	14:30 – 15:00 LIVE SCHEDULE ONLY	→
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.			
		HUAWEI	SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY 02:30 – 03:00 LIVE EVENT	→
		Meeting SE Researchers at Huawei			
		DEMOS	EVOLUTION 2 Chair: Giuseppe Scanniello	14:30 – 15:00 02:30 – 03:00 MIRROR	→
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.			
		DEMO	The Software Heritage Filesystem (SwhFS): Integrating Source Code Archival with Development Thibault Allançon, Antoine Pietri, Stefano Zacchiroli		
		DEMO	Guiding engineers with the Passive Process Engine Environment Christoph Mayr-Dorn, Stefan Bichler, Felix Keplinger, Alexander Egyed		
		DEMO	Creating and Migrating Chatbots with Conga Sara Perez-Soler, Esther Guerra, Juan de Lara		
		DEMO	Robot Runner: A Tool for Automatically Executing Experiments on Robotics Software Stan Swanborn, Ivano Malavolta		
		DEMO	R-MOZART: A Reconfiguration Tool for WebThings Applications Francisco Durán, Ajay Krishna, Michel Le Pallec, Radu Mateescu, Gwen Salaün		



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TIME CEST		Thursday, May 27 th			(6/14)
LIVE	MIRROR				
15:05 – 16:05	03:05 – 04:05	BLEND ED SESSION	MONITORING CLOUD-BASED SERVICES Chair: Andrea Zisman	15:05 – 16:05 03:05 – 04:05 MIRROR	→
		Technical Track	Fast Outage Analysis of Large-scale Production Clouds with Service Correlation Mining Yaohui Wang, Guozheng Li, Zijian Wang, Yu Kang, Yangfan Zhou, Hongyu Zhang, Feng Gao, Jeffrey Sun, Li Yang, Pochian Lee, Zhangwei Xu, Pu Zhao, Bo Qiao, Liqun Li, Xu Zhang, Qingwei Lin	15:05 – 15:25	
		SEIP	Neural Knowledge Extraction From Cloud Service Incidents Manish Shetty, Chetan Bansal, Sumit Kumar, Nikitha Rao, Nachiappan Nagappan, Thomas Zimmermann	15:25 – 15:45	
		SEIP	FIXME: Enhance Software Reliability with Hybrid Approaches in Cloud Jinho Hwang, Larisa Shwartz, Qing Wang, Raghav Batta, Harshit Kumar, Michael Nidd	15:45 – 16:05	
		BLEND ED SESSION	API: DEVELOPMENT Chair: Carolyn Seaman	15:05 – 16:05 03:05 – 04:05 MIRROR	→
		SEIP	Unveiling the Mystery of API Evolution in Deep Learning Frameworks -- A Case Study of Tensorflow 2 Zejun Zhang, Yanming Yang, Xin Xia, David Lo, Xiaoxue Ren, John Grundy	15:05 – 15:25	
		Technical Track	Domain-Specific Fixes for Flaky Tests with Wrong Assumptions on Underdetermined Specifications Peilun Zhang, Yanjie Jiang, Anjiang Wei, Victoria Stodden, Darko Marinov, August Shi	15:25 – 15:45	
		Technical Track	Studying Test Annotation Maintenance in the Wild Dong Jae Kim, Nikolaos Tsantalis, Tse-Hsun (Peter) Chen, Jinqiu Yang	15:45 – 16:05	
		BLEND ED SESSION	PROGRAM REPAIR: AUTOMATED PATCHING Chair: Antonia Bertolino	15:05 – 16:05 03:05 – 04:05 MIRROR	→
		Journal First	Automated Patch Transplantation Ridwan Salihin Shariffdeen, Shin Hwei Tan, Mingyuan Gao, Abhik Roychoudhury	15:05 – 15:25	
		Technical Track	Synthesizing Object State Transformers for Dynamic Software Updates Zelin Zhao, Yanyan Jiang, Chang Xu, Tianxiao Gu, Xiaoxing Ma  Awarded paper: ACM Europe Council Best Paper Award, ACM SIGSOFT Distinguished Paper Award	15:25 – 15:45	
		Technical Track	Fast and Precise On-the-fly Patch Validation for All Lingchao Chen, Yicheng Ouyang, Lingming Zhang	15:45 – 16:05	







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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th (7/14)		
LIVE	MIRROR			
15:05 – 16:05	03:05 – 04:05	BLEND ED SESSION	TESTING: FLAKY TESTS Chair: José Miguel Rojas	15:05 – 16:05 03:05 – 04:05 MIRROR →
		Journal First	Quantifying, Characterizing, and Mitigating Flakily Covered Program Elements Shivashree Vysali Vaidhyam Subramanian, Shane McIntosh, Bram Adams	15:05 – 15:25
		Technical Track	FlakeFlagger: Predicting Flakiness Without Rerunning Tests Abdulrahman Alshammari, Christopher Morris, Michael Hilton, Jonathan Bell  	15:25 – 15:45
		Technical Track	An Empirical Analysis of UI-based Flaky Tests Alan Romano, Zihe Song, Sampath Grandhi, Wei Yang, Weihang Wang  	15:45 – 16:05
		JSEET	NOVEL APPROACHES TO SE EDUCATION I Chair: Hakan Erdogmus	15:05 – 16:05 03:05 – 04:05 MIRROR →
		JSEET	Constructive Master's Thesis Work in Industry: Guidelines for Applying Design Science Research Eric Knauss	15:05 – 15:25
		JSEET	Onboarding in Software Product Lines: Concept Maps as Welcome Guides Maidier Azanza, Arantza Irastorza, Raul Medeiros, Oscar Diaz	15:25 – 15:45
		JSEET	Improving Concept Learning Through Specialized Digital Fanzines José Manuel Redondo López	15:45 – 16:05
		ACM SRC	ACM STUDENTS RESEARCH COMPETITION: FINAL ROUND - PRESENTATIONS 1 Chair: Aurora Ramírez, Sergio Segura	15:05 – 16:05 LIVE SCHEDULE ONLY →
		Presentations of selected papers from the jury		
16:05 – 16:25	04:05 – 04:25	SOCIAL	VIRTUAL TRIP TO MADRID A colleague from the ICSE Organising Committee will broadcast live a 20 minutes walk to show you one of the tourist landmarks in Madrid: Plaza de Oriente	16:05 – 16:25 04:05 – 04:25 MIRROR →



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TIME CEST		Thursday, May 27 th			(8/14)
LIVE	MIRROR				
16:30 – 17:30	04:30 – 05:30	BLEND ED SESS ION	DEEP NEURAL NETWORKS: DATA SELECTION Chair: Ayse Tosun	16:30 – 17:30 04:30 – 05:30 MIRROR	→
		Journal First	Test Selection for Deep Learning Systems Wei Ma, Mike Papadakis, Anestis Tsakmalis, Maxime Cordy, Yves Le Traon	16:30 – 16:50	
		SEIP	On the experiences of adopting automated data validation in an industrial machine learning project Lucy Ellen Lwakatare, Ellinor Rånge, Ivica Crnkovic, Jan Bosch	16:50 – 17:10	
		Technical Track	Distribution-Aware Testing of Neural Networks Using Generative Models Swaroop Dola, Matthew B Dwyer, Mary Lou Soffa  	17:10 – 17:30	
		BLEND ED SESS ION	SECURITY VULNERABILITIES: FROM 3RD PARTIES' CODE Chair: Jeff Carver	16:30 – 17:30 04:30 – 05:30 MIRROR	→
		Journal First	An Empirical Study of C++ Vulnerabilities in Crowd-Sourced Code Examples Morteza Verdi, Ashkan Sami, Jafar Akhondali, Foutse Khomh, Gias Uddin, Alireza Karami Motlagh	16:30 – 16:50	
		SEIP	Anomalous: Automated Detection of Anomalous and Potentially Malicious Commits on GitHub Danielle Gonzalez, Thomas Zimmermann, Patrice Godefroid, Max Schaefer	16:50 – 17:10	
		Technical Track	Why Security Defects Go Unnoticed during Code Reviews? A Case-Control Study of the Chromium OS Project Rajshakhar Paul, Asif Kamal Turzo, Amiangshu Bosu  	17:10 – 17:30	
		BLEND ED SESS ION	MUTATION TESTING: MUTANT SELECTION Chair: Sigrid Eldh	16:30 – 17:25 04:30 – 05:25 MIRROR	→
		Journal First	Killing Stubborn Mutants with Symbolic Execution Thierry Titchou Chekam, Mike Papadakis, Maxime Cordy, Yves Le Traon	16:30 – 16:50	
		NIER	Toward Speeding up Mutation Analysis by Memoizing Expensive Methods Ali Ghanbari, Andrian Marcus	16:50 – 17:05	
		SEIP	What It Would Take to Use Mutation Testing in Industry—A Study at Facebook Moritz Beller, Chu-Pan Wong, Johannes Bader, Andrew Scott, Mateusz Machalica, Satish Chandra, Erik Meijer	17:05 – 17:25	



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th (9/14)			
LIVE	MIRROR				
16:30 – 17:40	04:30 – 05:40	Blended Session	OPEN SOURCE: DEVELOPERS' SKILLS Chair: Daniela Damian	16:30 – 17:30 04:30 – 05:30 MIRROR	➔
		Journal First	Software Engineering Whispers: The Effect of Textual Vs. Graphical Software Design Descriptions on Software Design Communication Rodi Jolak, Maxime Savary-Leblanc, Manuela Dalibor, Andreas Wortmann, Regina Hebig, Juraj Vincur, Ivan Polasek, Xavier Le Pallec, Sebastian Gerard, Michel R. V. Chaudron	16:30 – 16:50	
		Technical Track	What Makes a Great Maintainer of Open Source Projects? Edson Dias, Paulo Meirelles, Fernando Castor, Igor Steinmacher, Igor Wiese, Gustavo Pinto Awarded paper: ACM SIGSOFT Distinguished Paper Award	16:50 – 17:10	
		Technical Track	Representation of Developer Expertise in Open Source Software Tapajit Dey, Andrey Karnauch, Audris Mockus  	17:10 – 17:30	
		JSEET	JSEET KEYNOTE AND JSEET BEST PAPER AWARD Chairs: Ana María Moreno and Hakan Erdogmus	16:30 – 17:40 04:30 – 05:40 MIRROR	➔
		Award	JSEET Best Paper Award - Teaching Model-based Requirements Engineering to Industry Professionals: An Experience Report Marian Daun, Jennifer Brings, Marcel Goger, Walter Koch, Thorsten Weyer	16:30 – 16:40	
		Keynote	Reflections on the Role of Software Architecture in Software Engineering Education David Garlan	16:40 – 17:40	
		ACM SRC	ACM STUDENTS RESEARCH COMPETITION: FINAL ROUND - PRESENTATIONS 2 Chairs: Aurora Ramírez, Sergio Segura	16:30 – 17:30 LIVE SCHEDULE ONLY	➔
		Presentations of selected papers from the jury			
		BREAK 20' 17:30 – 17:50 05:30 – 05:50 MIRROR			
17:50 – 18:45	05:50 – 06:45	Awards	Other ICSE Awards Chair: Antonia Bertolino	17:50 – 18:00 05:50 – 06:00 MIRROR	➔
		Keynote	JEANNETTE WING: Chair: Gail Murphy	18:00 – 18:45 06:00 – 06:45 MIRROR	➔
Data for Good: Ensuring the Responsible Use of Data to Benefit Society Brief summary of the Keynote here					
18:45 – 19:15	06:45 – 07:15	Meet With	MEET JEANNETTE WING	18:45 – 19:15 06:45 – 07:15 MIRROR	➔
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			



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TIME CEST		Thursday, May 27 th (10/14)		
LIVE	MIRROR			
18:15 – 19:15	06:45 – 07:15	NETWORKING	LGBTIQ+ GROUP MEETING	18:45 – 19:15 LIVE SCHEDULE ONLY →
		<p>Lesbian, Gay, Bisexual, Transgender, Intersexual, and Questioning (LGBTIQ) researchers and practitioners primarily come to software engineering conferences to discuss technical aspects of their work with the research community. But we are people, too, whose rights and safety are sometimes affected by the political climate. At this year's group meeting, LBGTIQ researchers, practitioners, and friends are invited to speak together to build community. We will also discuss how we fit in with our academic, industry, and governmental institutions, the current political climate around the world, and what we can do to help make all software engineering conferences and workshops to be safe and welcoming spaces for LBGTIQ members of the Software Engineering research community.</p>		
		NETWORKING	COFFEE CHAT	18:45 – 19:15 06:45 – 07:15 LIVE EVENT →
		<p>If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.</p>		
		Women in Software Engineering Research		
		Hablamos español		
		NETWORKING	MENTORING CIRCLE Chair: Thomas Zimmermann (LIVE SCHEDULE), Julia Rubin (MIRROR SCHEDULE)	18:45 – 19:15 06:45 – 07:15 LIVE EVENT →
		<p>ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.</p>		
		NETWORKING	MEET FACEBOOK RECRUITING & RESEARCH	18:45 – 19:15 LIVE SCHEDULE ONLY →
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook		
		DEMOS	TESTING 1 Chair: Francisco Servant	18:45 – 19:15 06:45 – 07:15 MIRROR →
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.		
		DEMO	Efficient Fuzz Testing for Apache Spark Using Framework Abstraction Qian Zhang, Jiyuan Wang, Muhammad Ali Gulzar, Rohan Padhye, Miryung Kim	
		DEMO	Quartermaster: A Tool for Modeling and Simulating System Degradation Matthew Pope, Jonathan Sillito	
		DEMO	Demo: Mutation-based Evaluation of Security-focused Static Analysis Tools for Android Amit Seal Ami, Kaushal Kafle, Kevin Moran, Adwait Nadkarni, Denys Poshyvanyk	



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th (11/14)		
LIVE	MIRROR			
19:20 – 20:15	07:20 – 08:15	Blended Session	TESTING: GENERAL ISSUES Chair: Claudia Ayala	19:20 – 20:15 07:20 – 08:15 MIRROR →
		NIER	Towards Evidence-based Testability Measurements Luca Guglielmo, Andrea Riboni, Giovanni Denaro	19:20 – 19:35
		Technical Track	GenTree: Using Decision Trees to Learn Interactions for Configurable Software KimHao Nguyen, ThanhVu Nguyen  	19:35 – 19:55
		Technical Track	Semantic Web Accessibility Testing via Hierarchical Visual Analysis Mohammad Bajammal, Ali Mesbah	19:55 – 20:15
		Blended Session	CONTINUOUS INTEGRATION, FEATURE MODELS AND PROGRAM TRANSFORMATION Chair: Antonia Bertolino	19:20 – 20:10 07:20 – 08:10 MIRROR →
		SEIP	Enterprise-Driven Open Source Software: A Case Study on Security Automation Florian Angermeir, Markus Voggenreiter, Fabiola Moyon, Daniel Mendez	19:20 – 19:40
		NIER	Towards Automated Testing and Debugging of Feature Models Viet-Man Le, Alexander Felfernig, Mathias Uta, David Benavides, Jose Galindo, Trang Tran	19:40 – 19:55
		NIER	Towards Modal Software Engineering Ramy Shahin	19:55 – 20:10
		Blended Session	SECURITY VULNERABILITIES: GENERAL ISSUES 1 Chair: Davide Fucci	19:20 – 20:15 07:20 – 08:15 MIRROR →
		Technical Track	Technical Leverage in a Software Ecosystem: Development Opportunities and Security Risks Fabio Massacci, Ivan Pashchenko	19:20 – 19:40
19:20 – 21:10	07:20 – 09:10	NIER	Secure Software Development in the Era of Fluid Multi-party Open Software and Services Ivan Pashchenko, Riccardo Scandariato, Antonino Sabetta, Fabio Massacci	19:40 – 19:55
		Journal First	Detecting Software Security Vulnerabilities via Requirements Dependency Analysis Wentao Wang, Faryn Dumont, Nan Niu, Glen Horton	19:55 – 20:15
19:20 – 21:10	07:20 – 09:10	TECHNICAL BRIEFING	BAYESIAN DATA ANALYSIS FOR SOFTWARE ENGINEERING Chair: Grace Lewis	19:20 – 21:10 07:20 – 09:10 MIRROR →
		Bayesian Data Analysis for Software Engineering Richard Torkar, Carlo A. Furia, Robert Feldt		



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Detailed Program: May 27th

TIME CEST		Thursday, May 27 th			(12/14)
LIVE	MIRROR				
20:15 – 20:45	08:15 – 08:45	NETWORKING	COMMUNITY SPEED NETWORKING	20:15 – 20:45 LIVE SCHEDULE ONLY	→
		In this series of speed networking events, ICSE participants can meet their peers.			
		LGBTIQ+ Andrew Begel			
		Blacks in Software Engineering			
		Women in Software Engineering			
		NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	20:15 – 20:45 LIVE SCHEDULE ONLY	→
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.			
		DEMOS	EVOLUTION 3 Chair: Francisco Servant	20:15 – 20:45 08:15 – 08:45 MIRROR	→
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.			
		DEMO	V2S: A Tool for Translating Video Recordings of Mobile App Usages into Replayable Scenarios Madeleine Havranek, Carlos Bernal-Cárdenas, Nathan Cooper, Oscar Chaparro, Denys Poshyvanyk, Kevin Moran		
20:50 – 21:50	08:50 – 09:50	DEMO	gazel: Supporting Source Code Edits in Eye-Tracking Studies Sarah Fakhoury, Devjeet Roy, Harry Pines, Tyler Cleveland, Cole S. Peterson, Venera Arnaoudova, Bonita Sharif, Jonathan I. Maletic		
		DEMO	COSTER: A Tool for Finding Fully Qualified Names of API Elements in Online Code Snippets C M Khaled Saifullah, Muhammad Asaduzzaman, Chanchal K. Roy		
		BLENDDED SESSION	SECURITY VULNERABILITIES: DIFFERENT DOMAINS Chair: Davide Fucci	20:50 – 21:50 08:50 – 09:50 MIRROR	→
		Technical Track	Containing Malicious Package Updates in npm with a Lightweight Permission System Gabriel Ferreira, Limin Jia, Joshua Sunshine, Christian Kaestner	20:50 – 21:10	
		Technical Track	Too Quiet in the Library: An Empirical Study of Security Updates in Android Apps' Native Code Sumaya Almanee, Arda Ünal, Mathias Payer, Joshua Garcia	21:10 – 21:30	
		Technical Track	If It's Not Secure, It Should Not Compile: Preventing DOM-Based XSS in Large-Scale Web Development with API Hardening Pei Wang, Julian Bangert, Christoph Kern	21:30 – 21:50	



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TIME CEST		Thursday, May 27 th			(13/14)
LIVE	MIRROR				
20:50 – 21:50	08:50 – 09:50	BLEND ED SESSION	PROGRAM REPAIR: GENERAL ISSUES Chair: Sira Vegas	20:50 – 21:50 08:50 – 09:50 MIRROR	→
		Technical Track	Bounded Exhaustive Search of Alloy Specification Repairs Simón Gutiérrez Brida, Germán Regis, Guolong Zheng, Hamid Bagheri, ThanhVu Nguyen, Nazareno Aguirre, Marcelo F. Frias	20:50 – 21:10	
			 		
		Technical Track	Shipwright: A Human-in-the-Loop System for Dockerfile Repair Jordan Henkel, Denini Silva, Leopoldo Teixeira, Marcelo d'Amorim, Thomas Reps	21:10 – 21:30	
			 		
		Technical Track	CURE: Code-Aware Neural Machine Translation for Automatic Program Repair Nan Jiang, Thibaud Lutellier, Lin Tan	21:30 – 21:50	
		BLEND ED SESSION	FAULT LOCALIZATION 2 Chair: Davide Falessi	20:50 – 21:50 08:50 – 09:50 MIRROR	→
		Technical Track	Fault Localization with Code Coverage Representation Learning Yi Li, Shaohua Wang, Tien N. Nguyen	20:50 – 21:10	
		Journal First	PerfJIT: Test-level Just-in-time Prediction for Performance Regression Introducing Commits Jinfu Chen, Weiyi Shang, Emad Shihab	21:10 – 21:30	
		SEIP	Scalable Statistical Root Cause Analysis on App Telemetry Vijayaraghavan Murali, Edward Yao, Umang Mathur, Satish Chandra	21:30 – 21:50	
		BLEND ED SESSION	SECURITY VULNERABILITIES: GENERAL ISSUES 2 Chair: Francisco Servant	20:50 – 21:40 08:50 – 09:40 MIRROR	→
		Technical Track	RAICC: Revealing Atypical Inter-Component Communication in Android Apps Jordan Samhi, Alexandre Bartel, Tegawendé F. Bissyandé, Jacques Klein	20:50 – 21:10	
			 		
		NIER	Towards a Model-Integrated Runtime Monitoring Infrastructure for Cyber-Physical Systems Michael Vierhauser, Hussein Marah, Antonio Garmendia, Jane Cleland-Huang, Manuel Wimmer	21:10 – 21:25	
		NIER	Should you Upgrade Official Docker Hub Images in Production Environments? Sara Gholami, Hamzeh Khazaei, Cor-Paul Bezemer	21:25 – 21:40	



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TIME CEST		Thursday, May 27 th		(14/14)
LIVE	MIRROR			
20:50 – 21:50	08:50 – 09:50	JSEET	NOVEL APPROACHES TO SE EDUCATION II Chair: Hakan Erdogmus	20:50 – 21:50 08:50 – 09:50 MIRROR →
		JSEET	Qualifying Software Engineers Undergraduates in DevOps - Challenges of introducing technical and non-technical concepts in a project-oriented course Isaque Alves and Carla Silva Rocha Aguiar	20:50 – 21:10
		JSEET	The Diversity of Gamification Evaluation in the Software Engineering Education and Industry: Trends, Comparisons and Gaps Rodrigo Monteiro, Maurício Souza, Sandro Oliveira, Carlos Portela and Cesar Lobato	21:10 – 21:30
		JSEET	An Inquisitive Code Editor for Addressing Novice Programmers' Misconceptions of Program Behavior Austin Henley, Julian Ball, Benjamin Klein, Aiden Rutter and Dylan Lee	21:30 – 21:50



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TIME CEST		Friday, May 28 th			(1/11)
LIVE	MIRROR				
10:00 – 10:55	22:00 – 22:55	BLEND ED SESSION	OPEN SOURCE: GENERAL ISSUES Chair: Igor Steinmacher	10:00 – 10:55 22:00 – 22:55 MIRROR	→
		Technical Track	Extracting Rationale for Software Development Decisions—A Study of Python Email Archives Pankajeshwara Sharma, Bastin Tony Roy Savarimuthu, Nigel Stanger	10:00 – 10:20	
		SEIP	An Empirical Study of the Landscape of Open Source Projects in Baidu, Alibaba, and Tencent Junxiao Han, Shuiguang Deng, David Lo, Chen Zhi, Jianwei Yin, Xin Xia	10:20 – 10:40	
		SEIS	Understanding Community Smells Variability: A Statistical Approach Gemma Catolino, Fabio Palomba, Damian Andrew Tamburri, Alexander Serebrenik  	10:40 – 10:55	
		BLEND ED SESSION	AGILE METHODS Chair: Silverio Martínez-Fernández	10:00 – 10:55 22:00 – 22:55 MIRROR	→
		Journal First	Real World Scrum A Grounded Theory of Variations in Practice Zainab Masood, Rashina Hoda, Kelly Blincoe	10:00 – 10:20	
		SEIS	Awareness and Perception of Agile in Saudi Software Industry Fahad Altuwaijri, Maria Angela Ferrario	10:20 – 10:35	
		Technical Track	Playing Planning Poker in Crowds: Human Computation of Software Effort Estimates Mohammed Alhamed, Tim Storer	10:35 – 10:55	
		BLEND ED SESSION	PRIVACY IN APPS: CASES FROM COVID-19 Chair: Andrea Zisman	10:00 – 10:55 22:00 – 22:55 MIRROR	→
		SEIS	COVID-19 Vs Social Media apps: Does privacy really matter? Omar Haggag, Sherif Haggag, John Grundy, Mohamed Abdelrazek	10:00 – 10:15	
		Technical Track	An Empirical Assessment of Global COVID-19 Contact Tracing Applications Ruoxi Sun, Wei (Zach) Wang, Minhui (Jason) Xue, Gareth Tyson, Seyit Camtepe, Damith C. Ranasinghe  	10:15 – 10:35	
		Technical Track	Sustainable Solving: Reducing The Memory Footprint of IFDS-Based Data Flow Analyses Using Intelligent Garbage Collection Steven Arzt	10:35 – 10:55	



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Detailed Program: May 28th

TIME CEST		Friday, May 28 th				(2/11)
LIVE	MIRROR					
10:00 – 11:00	22:00 – 23:00	Blended Session	Image Processing Chair: Oscar Pastor		10:00 – 10:55 22:00 – 22:55 MIRROR	→
		Journal First	psc2code: Denoising Code Extraction from Programming Screencasts Lingfeng Bao , Zhenchang Xing, Xin Xia, David Lo, Minghui Wu, Xiaohu Yang			10:00 – 10:20
		Technical Track	IMGDroid: Detecting Image Loading Defects in Android Applications Wei Song, Mengqi Han, Jeff Huang			10:20 – 10:40
		SEIS	Image-based Social Sensing: Combining AI and the Crowd to Mine Policy-Adherence Indicators from Twitter Virginia Negri, Dario Scuratti, Stefano Agresti, Donya Rooein, Gabriele Scalia, Jose Luis Fernandez-Marquez, Amudha Ravi Shankar, Mark Carman, Barbara Pernici			10:40 – 10:55
		JSEET	Institutional Strategies to SE Education II Chairs: Ana María Moreno		10:00 – 11:00 22:00 – 23:00 MIRROR	→
		JSEET	Is Secure Coding Education in the Industry Needed? An Investigation Through a Large Scale Survey Tiago Espinha Gasiba, Ulrike Lechner, Maria Pinto-Albuquerque and Daniel Mendez			10:00 – 10:20
		JSEET	To get good student ratings you should only teach programming courses? Investigation and implications of student evaluations of teaching in a software engineering context Antti Knutas, Timo Hynninen and Maija Hujala			10:20 – 10:40
		JSEET	Morning or Evening? An Examination of Circadian Rhythms of CS1 Students Albina Zavgorodniaia, Raj Shrestha, Juho Leinonen, Arto Hellas and John Edwards			10:40 – 11:00
		Networking	Take a coffee with the Open Science Chair of ICSE 2021		10:55 – 11:25 Live Schedule Only	→
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!				
10:55 – 11:25	---	Networking	Mentoring Circle Chair: Lars Grunske		10:55 – 11:25 Live Schedule Only	→
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.				
		Huawei	SE Research @ Huawei		10:55 – 11:25 Live Schedule Only	→
		Meeting SE Researchers at Huawei				



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Detailed Program: May 28th

TIME CEST		Friday, May 28 th (3/11)				
LIVE	MIRROR					
10:55 – 11:25	22:55 – 23:25	FACEBOOK	MEET FACEBOOK RECRUITING & RESEARCH		MIRROR SCHEDULE ONLY 22:55 – 23:25 LIVE	→
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook				
		DEMOS	TESTING 2 Chair: Giuseppe Scanniello		10:55 – 11:25 22:55 – 23:25 MIRROR	→
		Each demo makes a 1-minute presentation (displayed in the Demonstration room). At the end of each presentation, a breakout room will be created for each demo. Attendees will be able to join and discuss with the authors.				
		DEMO	FastCA: An Effective and Efficient Tool for Combinatorial Covering Array Generation Jinkun Lin, Shaowei Cai, Bing He, Yingjie Fu, Chuan Luo, Qingwei Lin			
		DEMO	GAssert: A Fully Automated Tool to Improve Assertion Oracles Valerio Terragni, Gunel Jahangirova, Paolo Tonella, Mauro Pezze			
		DEMO	UIS-Hunter: Detecting UI Design Smells in Android Apps Bo Yang, Zhenchang Xing, Xin Xia, Chunyang Chen, Deheng Ye, Shanping Li			
11:10 – 13:00	23:10 – 01:00	DEMO	Testing Framework for Black-box AI Models Aniya Aggarwal, Samiulla Shaikh, Sandeep Hans, Swastik Haldar, Rema Ananthanarayanan, Diptikalyan Saha			
		TECHNICAL BRIEFING	ADVANCES IN CODE SUMMARIZATION Chair: Xavier Franch		11:10 – 13:00 23:10 – 01:00 MIRROR	→
		Advances in Code Summarization Utkarsh Desai, Giriprasad Sridhara, Srikanth Tamilselvam				
11:30 – 12:30	23:30 – 00:30	BLENDED SESSION	API: EVOLUTION AND MAINTENANCE 2 Chair: Giuseppe Scanniello		11:30 – 12:30 23:30 – 00:30 MIRROR	→
		SEIP	Identifying and Characterizing Silently-Evolved Methods in the Android API Pei Liu, Li Li, Yichun Yan, Mattia Fazzini, John Grundy		11:30 – 11:50	
		Technical Track	DepOwl: Detecting Dependency Bugs to Prevent Compatibility Failures Zhouyang Jia, Shanshan Li, Tingting Yu, Chen Zeng, Erci Xu, Xiaodong Liu, Ji Wang, Xiangke Liao		11:50 – 12:10	
		Technical Track	Hero: On the Chaos When PATH Meets Modules Ying Wang, Liang Qiao, Chang Xu, Yepang Liu, Shing-Chi Cheung, Na Meng, Hai Yu, Zhiliang Zhu		12:10 – 12:30	
		Awarded paper: ACM SIGSOFT Distinguished Paper Award				



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Detailed Program: May 28th

TIME CEST		Friday, May 28 th			(4/11)
LIVE	MIRROR				
11:30 – 12:30	23:30 – 00:30	BLEND ED SESSION	TESTING: AUTOMATION Chair: José Miguel Rojas	11:30 – 12:30 23:30 – 00:30 MIRROR	→
		SEIP	IntelliGen: Automatic Driver Synthesis for FuzzTesting Mingrui Zhang, Jianzhong Liu, Fuchen Ma, Huafeng Zhang, Yu Jiang	11:30 – 11:50	
		Technical Track	Layout and Image Recognition Driving Cross-Platform Automated Mobile Testing Shengcheng Yu, Chunrong Fang, Yexiao Yun, Yang Feng	11:50 – 12:10	
		SEIP	Industry Practice of Coverage-Guided Enterprise-Level DBMS Fuzzing Mingzhe Wang, Zhiyong Wu, Xinyi Xu, Jie Liang, Chijin Zhou, Huafeng Zhang, Yu Jiang	12:10 – 12:30	
		BLEND ED SESSION	TESTING: 3RD PARTY SOFTWARE Chair: Leonardo Mariani	11:30 – 12:30 23:30 – 00:30 MIRROR	→
		Technical Track	Evaluating Unit Testing Practices in R Packages Melina Vidoni	11:30 – 11:50	
		Technical Track	Data-Oriented Differential Testing of Object-Relational Mapping Systems Thodoris Sotiropoulos, Stefanos Chaliasos, Vaggelis Atlidakis, Dimitris Mitropoulos, Diomidis Spinellis   Awarded: Distinguished Artifact Award – Replication Package	11:50 – 12:10	
		Journal First	A Practical Approach to Verification of Floating-Point C/C++ Programs with math.h/cmath Functions Roberto Bagnara, Michele Chiari, Roberta Gori, Abramo Bagnara	12:10 – 12:30	
		BLEND ED SESSION	FAULT LOCALIZATION 3 Chair: Mika Mäntylä	11:30 – 12:30 23:30 – 00:30 MIRROR	→
		Technical Track	An Empirical Study on Deployment Faults of Deep Learning Based Mobile Applications Zhenpeng Chen, Huihan Yao, Yiling Lou, Yanbin Cao, Yuanqiang Liu, Haoyu Wang, Xuanzhe Liu	11:30 – 11:50	
		SEIP	MicroHECL: High-Efficient Root Cause Localization in Large-Scale Microservice Systems Dewei Liu, Chuan He, Xin Peng, Fan Lin, Chenxi Zhang, Shengfang Gong, Ziang Li, Jiayu Ou, Zheshun Wu	11:50 – 12:10	
		Technical Track	Extracting Concise Bug-Fixing Patches from Human-Written Patches in Version Control Systems Yanjie Jiang, Hui Liu, Nan Niu, Lu Zhang, Yamin Hu	12:10 – 12:30	



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Detailed Program: May 28th

TIME CEST		Friday, May 28 th (5/11)				
LIVE	MIRROR					
12:30 – 13:00	00:30 – 01:00	NETWORKING	MEET YOUR PEERS	12:30 – 13:00 00:30 – 01.00 LIVE EVENT	→	
		In this series of speed networking events, ICSE participants can meet their academic peers				
		We love dogs				
		We love cats				
		We Love other pets				
		No pets				
		NETWORKING	ICSE IS RUNNING Chairs: Ayushi Rastogi, Luís Cruz	12:30 – 13:00 00:30 – 01:00 MIRROR	→	
The first-ever virtual run event at ICSE! From 25-27, May 2021 AOE attendees from all over the world will run 5 km. Join us! #ICSE21isRunning						
BREAK 35'						13:00 – 13:35 01:00 – 01:35 MIRROR
13:35 – 14:30	01:35 – 02:30	AWARDS	IEEE TCSE Harlan Mills Award Chair: Forrest Shull	13:35 – 13:45 01:35 – 01:45 MIRROR	→	
		AWARD LECTURE	DIETER ROMBACH Chair: Forrest Shull	13:45 – 14:30 01:45 – 02:30 MIRROR	→	
		Software Engineering - Theory for Practice				
14:30 – 15:00	02:30 – 03:00	MEET WITH	MEET DIETER ROMBACH	14:30 – 15:00 02:30 – 03:00 MIRROR	→	
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them				
		NETWORKING	COFFEE CHAT	14:30 – 15:00 LIVE SCHEDULE ONLY	→	
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.				
		Women in Software Engineering Research				
		Hablamos español				
		NETWORKING	MENTORING CIRCLE Chair: Diomidis Spinellis	14:30 – 15:00 LIVE SCHEDULE ONLY	→	
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.				
INVENIA	OPPORTUNITIES AT INVENIA LABS	14:30 – 15:00 LIVE SCHEDULE ONLY	→			
A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.						



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TIME CEST		Friday, May 28 th			(6/11)
LIVE	MIRROR				
15:05 – 16:05	03:05 – 04:05	BLEND ED SESSION	ANALYZING SYSTEM PROPERTIES: CORRECTNESS, DETERMINISM, REALIZABILITY		15:05 – 16:05 03:05 – 04:05 MIRROR →
		Technical Track	JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification Jihyeok Park, Seungmin An, Dongjun Youn, Gyeongwon Kim, Sukyoung Ryu   <i>Awarded paper: ACM SIGSOFT Distinguished Paper Award</i>		15:05 – 15:25
		Technical Track	Unrealizable Cores for Reactive Systems Specifications Shahar Maoz, Rafi Shalom 		15:25 – 15:45
		Technical Track	Verifying Determinism in Sequential Programs Rashmi Mudduluru, Jason Waataja, Suzanne Millstein, Michael D. Ernst 		15:45 – 16:05
		BLEND ED SESSION	PERFORMANCE MODELING OF HIGHLY CONFIGURABLE SOFTWARE SYSTEMS		15:05 – 16:05 03:05 – 04:05 MIRROR →
		Technical Track	White-Box Performance-Influence Models: A Profiling and Learning Approach Max Weber, Sven Apel, Norbert Siegmund  		15:05 – 15:25
		Technical Track	White-Box Analysis over Machine Learning: Modeling Performance of Configurable Systems Miguel Velez, Pooyan Jamshidi, Norbert Siegmund, Sven Apel, Christian Kaestner		15:25 – 15:45
		Journal First	ConEx: Efficient Exploration of Big-Data System Configurations for Better Performance Rahul Krishna, Chong Tang, Kevin Sullivan, Baishakhi Ray		15:45 – 16:05
		BLEND ED SESSION	CODE REVIEW: READABILITY AND REFACTORING		15:05 – 16:05 03:05 – 04:05 MIRROR →
		Journal First	The Effectiveness of Supervised Machine Learning Algorithms in Predicting Software Refactoring Maurício Aniche, Erick Maziero, Rafael S. Durelli, Vinicius Durelli		15:05 – 15:25
		Journal First	How Does Code Readability Change During Software Evolution? Valentina Piantadosi, Fabiana Fierro, Simone Scalabrino, Alexander Serebrenik, Rocco Oliveto		15:25 – 15:45
		SEIP	Refactoring Practices in the Context of Modern Code Review: An Industrial Case Study at Xerox Eman Abdullah AlOmar, Hussein Alrubaye, Mohamed Wiem Mkaouer, Ali Ouni, Marouane Kessentini		15:45 – 16:05



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TIME CEST		Friday, May 28 th (7/11)			
LIVE	MIRROR				
15:05 – 16:05	03:05 – 04:05	BLEND ED SESSION	CONFIGURATION OF SOFTWARE SYSTEMS: OPTIMIZATION Chair: Sergio Segura	15:05 – 16:05 03:05 – 04:05 MIRROR	→
		Technical Track	Resource-Guided Configuration Space Reduction for Deep Learning Models Yanjie Gao, Yonghao Zhu, Hongyu Zhang, Haoxiang Lin, Mao Yang	15:05 – 15:25	
		Journal First	ConfigMiner: Identifying the Appropriate Configuration Options for Config-related User Questions by Mining Online Forums Mohammed Sayagh, Ahmed E. Hassan	15:25 – 15:45	
		Journal First	Whence to Learn? Transferring Knowledge in Configurable Systems using BEETLE Rahul Krishna, Vivek Nair, Pooyan Jamshidi, Tim Menzies	15:45 – 16:05	
15:05 – 16:25	03:05 – 04:25	JSEET	TEACHING SOFTWARE QUALITY II Chair: Ana María Moreno	15:05 – 16:25 03:05 – 04:25 MIRROR	→
		JSEET	Finding Anomalies in Scratch Assignments Nina Körber, Katharina Geldreich, Andreas Stahlbauer and Gordon Fraser	15:05 – 15:25	
		JSEET	How do students test software units? Lex Bijlsma, Niels Doorn, Harrie Passier, Harold Pootjes and Sylvia Stuurman	15:25 – 15:45	
		JSEET	SQLRepair: Identifying and Repairing Mistakes in Student-Authored SQL Queries Kai Presler-Marshall, Sarah Heckman and Kathryn Stolee	15:45 – 16:05	
		JSEET	LitterBox: A Linter for Scratch Programs Gordon Fraser, Ute Heuer, Nina Körber, Florian Obermüller and Ewald Wasmeier	16:05 – 16:25	
15:05 – 17:20	03:05 – 05:20	TECHNICAL BRIEFING	THE SOFTWARE CHALLENGES OF BUILDING SMARTCHATBOTS Chair: Grace Lewis	15:05 – 17:20 03:05 – 05:20 MIRROR	→
		The Software Challenges of Building SmartChatbots Gwendal Daniel, Jordi Cabot			
16:05 – 16:35	---	NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	16:05 – 16:35 LIVE SCHEDULE ONLY	→
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.			
		NETWORKING	TAKE A COFFEE WITH THE PROGRAM CO-CHAIRS OF ICSE 2022	16:05 – 16:35 LIVE SCHEDULE ONLY	→
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!			



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TIME CEST		Friday, May 28 th			(8/11)
LIVE	MIRROR				
16:05 – 16:35	---	NETWORKING		ICPC Chair: Alexander Serebrenik	16:05 – 16:35 LIVE SCHEDULE ONLY →
		The ICPC event is video presenting the program comprehension community to the broader ICSE audience. We interview several junior and senior researchers working on different aspects of program comprehension and introduce the upcoming edition of ICPC!			
16:40 – 18:00	04:40 – 06:00	BLENDED SESSION		SEIP TALKS Chair: Sigrid Eldh	16:40 – 17:55 04:40 – 05:55 MIRROR →
		SEIP	How to integrate with real cars - minimizing lead time at Volkswagen		16:40 – 17:05
			Michael Nolting, Jan Kantert		
		SEIP	Re-Imagining Performance Reviews: Automated Dashboards for Continuous Visibility of Engineers' Performance		17:05 – 17:30
			Fatma Meawad		
		SEIP	Challenges and Gratitude: A Diary Study of Software Engineers Working From Home During Covid-19 Pandemic		17:30 – 17:55
			Jenna Butler, Sonia Jaffe		
		BLENDED SESSION		DEFECT PREDICTION: MODELING AND PERFORMANCE Chair: Ayse Tosun	16:40 – 18:00 04:40 – 06:00 MIRROR →
		Journal First	On the Need of Preserving Order of Data When Validating Within-Project Defect Classifiers		16:40 – 17:00
			Davide Falessi, Jacky Huang, Likhita Narayana, Jennifer Fong Thai, Burak Turhan		
		Journal First	Using black-box performance models to detect performance regressions under varying workloads: an empirical study		17:00 – 17:20
			Lizhi Liao, Jinfu Chen, Heng Li, Yi Zeng, Weiyi Shang, Jianmei Guo, Catalin Sporea, Andrei Toma, Sarah Sajedi		
		Journal First	Predicting Performance Anomalies in Software Systems at Run-time		17:20 – 17:40
			Guoliang Zhao, Safwat Hassan, Ying Zou, Derek Truong, Toby Corbin		
		Technical Track	How Developers Optimize Virtual Reality Applications: A Study of Optimization Commits in Open Source Unity Projects		17:40 – 18:00
			Fariha Nusrat, Foyzul Hassan, Hao Zhong, Xiaoyin Wang		



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TIME CEST		Friday, May 28 th (9/11)			
LIVE	MIRROR				
16:40 – 17:55	04:40 – 05:55	BLEND ED SESSION	DEVELOPERS: WELL-BEING AND PRODUCTIVITY Chair: Birgit Penzenstadler	16:40 – 17:55 04:40 – 05:55 MIRROR	➔
		SEIS	QFL: Data-Driven Feedback Loop to Manage Quality in Agile Development Lidia López, Alessandra Bagnato, Antonin Ahbervé, Xavier Franch	16:40 – 16:55	
		SEIP	The Daily Life of Software Engineers during the COVID-19 Pandemic Daniel Russo, Paul Hanel, Seraphina Altnickel, Niels Van Berkel	16:55 – 17:15	
		Journal First	Pandemic Programming: How Covid-19 affects software developers and how their organizations can help Paul Ralph, Sebastian Baltes, Gianisa Adisaputri, Richard Torkar, Vladimir Kovalenko, Marcos Kalinowski, Nicole Novielli, Shin Yoo, Xavier Devroey, Xin Tan, Minghui Zhou, Burak Turhan, Rashina Hoda, Hideaki Hata, Gregorio Robles, Amin Milani Fard, Rana Alkadhi	17:15 – 17:35	
		Technical Track	“How Was Your Weekend?” Software Development Teams Working From Home During COVID-19 Courtney Miller, Paige Rodeghero, Margaret-Anne Storey, Denae Ford, Thomas Zimmermann   Awarded paper: ACM SIGSOFT Distinguished Paper Award	17:35 – 17:55	
		BLEND ED SESSION	SOURCE CODE HISTORIES AND DOCUMENTATION Chair: Davide Fucci	16:40 – 17:50 04:40 – 05:50 MIRROR	➔
		SEIS	Understanding Emotions of Developer Community Towards Software Documentation Akhila Sri Manasa Venigalla, Sridhar Chimalakonda	16:40 – 16:55	
		Technical Track	On Indirectly Dependent Documentation in the Context of Code Evolution: A Study Devika Sondhi, Avyakt Gupta, Salil Purandare, Ankit Rana, Deepanshu Kaushal, Rahul Purandare  	16:55 – 17:15	
		NIER	Mining Software Repositories with a Collaborative Heuristic Repository Hlib Babii, Julian Prenner, Laurin Stricker, Anjan Karmakar, Andrea Janes, Romain Robbes	17:15 – 17:30	
		Technical Track	CodeShovel: Constructing Method-Level Source Code Histories Felix Grund, Shaiful Alam Chowdhury, Nick Bradley, Braxton Hall, Reid Holmes   Awarded paper: ACM SIGSOFT Distinguished Paper Award	17:30 – 17:50	
BREAK 20'					
18:00 – 18:20 06:00 – 06:20 MIRROR					



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TIME CEST		Friday, May 28 th			(10/11)
LIVE	MIRROR				
18:20 – 19:30	06:20 – 07:30	AWARDS		Other IEEE TCSE Awards Chair: Ladan Tahvildari	18:20 – 18:30 06:20 – 06:30 MIRROR →
		TOWN HALL		18:30 – 19:30 06:30 – 07:30 MIRROR →	
		NETWORKING Chairs: Thomas Zimmermann, Ladan Tahvildari			
Learn more about the activities of IEEE TCSE and ACM SIGSOFT. Discuss issues and share ideas on how to improve the Software Engineering community.					
19:30 – 20:30	07:30 – 08:30	GAMES		19:30 – 20:30 07:30 – 08:30 MIRROR →	
		Chair: Gregorio Robles			
		Journal First	An Empirical Study of the Characteristics of Popular Minecraft Mods Daniel Lee, Gopi Krishnan Rajbahadur, Dayi Lin, Mohammed Sayagh, Cor-Paul Bezemer, Ahmed E. Hassan		19:30 – 19:50
		Journal First	Building the perfect game – an empirical study of game modifications Daniel Lee, Dayi Lin, Cor-Paul Bezemer, Ahmed E. Hassan		19:50 – 20:10
		Technical Track	We'll Fix It in Post: What Do Bug Fixes in Video Game Update Notes Tell Us? Andrew Truelove, Eduardo Santana de Almeida, Iftekhar Ahmed		20:10 – 20:30
		PATTERNS AND SMELLS		19:30 – 20:30 07:30 – 08:30 MIRROR →	
		Chair: Davide Falessi			
		Journal First	Are Multi-language Design Smells Fault-prone? An Empirical Study Mouna Abidi, Md Saidur Rahman, Moses Openja, Foutse Khomh		19:30 – 19:50
		Journal First	Investigating Design Anti-pattern and Design Pattern Mutations and Their Change- and Fault-proneness Zeinab Kermansaravi, Md Saidur Rahman, Foutse Khomh, Fehmi Jaafar, Yann-Gaël Guéhéneuc		19:50 – 20:10
		SEIP	Automatically Authoring Regression Tests for Machine-Learning Based Systems Junjie Zhu, Teng Long, Atif Memon		20:10 – 20:30
		PROGRAMMING: LOW LEVEL		19:30 – 20:30 07:30 – 08:30 MIRROR →	
		Chair: Ignacio Panach			
Journal First	A Chaos Engineering System for Live Analysis and Falsification of Exception-handling in the JVM Long Zhang, Brice Morin, Philipp Haller, Benoit Baudry, Martin Monperrus		19:30 – 19:50		
Technical Track	Interface Compliance of Inline Assembly: Automatically Check, Patch and Refine Frédéric Recoules, Sébastien Bardin, Richard Bonichon, Matthieu Lemerre, Laurent Mounier, Marie-Laure Potet  Awarded paper: ACM SIGSOFT Distinguished Paper Award		19:50 – 20:10		
Technical Track	Enabling Software Resilience in GPGPU Applications via Partial Thread Protection Lishan Yang, Bin Nie, Adwait Jog, Evgenia Smirni		20:10 – 20:30		



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Detailed Program: May 28th

TIME CEST		Friday, May 28 th (11/11)		
LIVE	MIRROR			
19:30 – 20:30	07:30 – 08:30	BLENDED SESSION	OBTAINING INFORMATION FROM ISSUES AND COMMITS Chair: Antonia Bertolino	19:30 – 20:30 07:30 – 08:30 MIRROR →
		Journal First	Automated Issue Assignment: Results and Insights from an Industrial Case Ethem Utku Aktas, Cemal Yilmaz	19:30 – 19:50
		Journal First	On the feasibility of automated prediction of bug and non-bug issues Steffen Herbold, Alexander Trautsch, Fabian Trautsch	19:50 – 20:10
		Journal First	Better Data Labelling with EMBLEM (and how that Impacts Defect Prediction) Huy Tu, Zhe Yu, Tim Menzies	20:10 – 20:30
		JSEET	TEAM PRACTICES Chairs: Hakan Erdogmus	19:30 – 20:30 07:30 – 08:30 MIRROR →
		JSEET	Who Does What? Work Division and Allocation Strategies of Computer Science Student Teams Anna van der Meulen and Efthimia Aivaloglou	19:30 – 19:50
		JSEET	Assessment of a hybrid software development process for student projects: a controlled experiment Rafal Wlodarski, Jean-Rémy Falleri and Corinne Parvéry	19:50 – 20:10
		JSEET	Bluejay: A Cross-Tooling Audit Framework For Agile Software Teams César García, Alejandro Guerrero, Joshua Zeitsoff, Srujay Korlakunta, Pablo Fernandez, Armando Fox and Antonio Ruiz-Cortés	20:10 – 20:30
20:30 – 21:00	---	SOCIAL	FLAMENCO LESSON & PARTY 2	20:30 – 21:00 LIVE SCHEDULE ONLY →
		An online Flamenco class and party that will immerse you in the cultural experience of flamenco Read here to start preparing yourself for clapping and castanets (https://www.ishowusevilla.com/en).		
21:05 – 21:20	09:05 – 09:20	ACM SRC	ACM STUDENTS RESEARCH COMPETITION AND SCORE AWARDS Chair: Antonia Bertolino	21:05 – 21:20 09:05 – 09:20 MIRROR →
21:20 – 21:45	09:20 – 09:45	CLOSING CEREMONY		21:20 – 21:45 09:20 – 09:45 MIRROR →
		Laurie Williams, Natalia Juristo		



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Schedule

TECHNICAL TRACK AWARDS AND ACM EUROPE COUNCIL BEST PAPER AWARD Tuesday, May 25 th 13:45 – 14:00 (01:45 – 02:00 MIRROR)	→
ACM SIGSOFT OUTSTANDING RESEARCH AWARD Tuesday, May 25 th 17:50 – 18:00 (05:50 – 06:00 MIRROR)	→
OTHER ACM SIGSOFT AWARDS Wednesday, May 26 th 17:20 – 17:30 (05:20 – 05:30 MIRROR)	→
ICSE 2011 MOST INFLUENTIAL PAPER AWARD Thursday, May 27 th 13:35 – 13:45 (01:35 – 01:45 MIRROR)	→
OTHER ICSE AWARDS Thursday, May 27 th 17:50 – 18:00 (05:50 – 06:00 MIRROR)	→
IEEE TCSE HARLAN MILLS AWARD Friday, May 28 th 13:35 – 13:45 (01:35 – 01:45 MIRROR)	→
OTHER IEEE TCSE AWARDS Friday, May 28 th 18:20 – 18:30 (06:20 – 06:30 MIRROR)	→

Awardees

ACM Europe Council Best Paper Award

Zelin Zhao, Yanyan Jiang, Chang Xu, Tianxiao Gu and Xiaoxing Ma for their paper “Synthesizing Object State Transformers for Dynamic Software Updates”.

ICSE 2021 Awards

Most Influential Paper from ICSE 2021

The Most Influential Paper Award goes to **Andrea Arcuri** and **Lionel Briand** for their ICSE 2021 paper entitled “A Practical Guide for Using Statistical Tests to Assess Randomized Algorithms in Software Engineering”, addressing the key challenges of using statistical tests in software engineering.

ACM SIGSOFT Distinguished Paper Award

ATVHunter: Reliable Version Detection of Third-Party Libraries for Vulnerability Identification in Android Apps
Xian Zhan, Lingling Fan, Sen Chen, Feng Wu, Tianming Liu, Xiapu Luo, Yang Liu

Automated Query Reformulation for Efficient Search Based on Query Logs from Stack Overflow
Kaibo Cao, Chunyang Chen, Sebastian Baltes, Christoph Treude, Xiang Chen

CodeShovel: Constructing Method-Level Source Code Histories
Felix Grund, Shaiful Alam Chowdhury, Nick Bradley, Braxton Hall, Reid Holmes

Hero: On the Chaos When PATH Meets Modules
Ying Wang, Liang Qiao, Chang Xu, Yepang Liu, Shing-Chi Cheung, Na Meng, Hai Yu, Zhiliang Zhu

"How Was Your Weekend?" Software Development Teams Working From Home During COVID-19
Courtney Miller, Paige Rodeghero, Margaret-Anne Storey, Denae Ford, Thomas Zimmermann

Improving Fault Localization by Integrating Value and Predicate Based Causal Inference Techniques

Yigit Kucuk, Tim A. D. Henderson, Andy Podgurski

Interface Compliance of Inline Assembly: Automatically Check, Patch and Refine

Frédéric Recoules, Sébastien Bardin, Richard Bonichon, Matthieu Lemerre, Laurent Mounier, Marie-Laure Potet

JEST: N+1-version Differential Testing of Both JavaScript Engines and Specification

Jihyeok Park, Seungmin An, Dongjun Youn, Gyeongwon Kim, Sukyoung Ryu

Program Comprehension and Code Complexity Metrics: An fMRI Study

Norman Peitek, Sven Apel, Chris Parnin, André Brechmann, Janet Siegmund

Synthesizing Object State Transformers for Dynamic Software Updates

Zelin Zhao, Yanyan Jiang, Chang Xu, Tianxiao Gu, Xiaoxing Ma

Traceability Transformed: Generating moreAccurate Links with Pre-Trained BERT Models

Jinfeng Lin, Yalin Liu, Qingkai Zeng, Meng Jiang, Jane Cleland-Huang

What Makes a Great Maintainer of Open Source Projects?

Edson Dias, Paulo Meirelles, Fernando Castor, Igor Steinmacher, Igor Wiese, Gustavo Pinto

Why don't Developers Detect Improper Input Validation?'; DROP TABLE Papers; -

Larissa Braz, Enrico Fregnan, Gül Calikli, Alberto Bacchelli

Distinguished Artifact Award

Replication Package for Article: Data-Oriented Differential Testing of Object-Relational Mapping Systems

Thodoris Sotiropoulos, Stefanos Chaliasos, Vaggelis Atlidakis, Dimitris Mitropoulos, Diomidis Spinellis

Artifact for Enhancing Genetic Improvement of Software with Regression Test Selection

Giovani Guizzo, Justyna Petke, Federica Sarro, Mark Harman

Distinguished Reviewer Award

Gabriele Bavota, USI-Lugano, Switzerland

Maria Christakis, Max Planck Institute for Software Systems, Germany

Fabiano Dalpiaz, Utrecht University, Netherlands

Miryung Kim, University of California at Los Angeles, USA

Julia Lawall, INRIA, France

Emerson Murphy-Hill, Google, USA

Antonio Ruiz-Cortés, University of Seville, Spain

Yulei Sui, University of Technology Sydney, Australia

Jonathan Bell, Northeastern University, USA

Myra Cohen, Iowa State University, USA

Stephanie Forrest, Arizona State University, USA

Shriram Krishnamurthi, Brown University, USA

Xiaoxing Ma, Nanjing University, China

Martin Pinzger, Alpen-Adria-Universität Klagenfurt, Austria

Kathryn Stolee, North Carolina State University, USA

Paolo Tonella, USI-Lugano, Switzerland

IEEE Software Distinguished Paper Award - Software Engineering in Practice

Industry-scale IR-based Bug Localization: A Perspective from Facebook

Vijayaraghavan Murali, Lee Gross, Rebecca Qian, Satish Chandra

Best Paper - Joint Track for Software Engineering Education and Training (JSEET)

Teaching Model-based Requirements Engineering to Industry Professionals: An Experience Report

Marian Daun, Jennifer Brings, Marcel Goger, Walter Koch, Thorsten Weyer

Software Engineering in Society Distinguished Paper Award

Awareness and Perception of Agile in Saudi Software Industry

Fahad Altuwaijri, Maria Angela Ferrario

ACM SIGSOFT 2021 Awards

ACM SIGSOFT Outstanding Research Award

The ACM SIGSOFT Outstanding Research Award goes to **Prof. Prem Devanbu** (UC Davis) “for profoundly changing the way researchers think about software by exploring connections between source code and natural language”.

ACM SIGSOFT Influential Educator Award

The ACM SIGSOFT Influential Educator Award goes to **Prof. Katsuro Inoue** (Osaka University) “for his life-long foundational contributions to software engineering education and his success in connecting generations of educators and researchers from Japan with the international community”

ACM SIGSOFT Distinguished Service Award

The ACM SIGSOFT Distinguished Service Awards goes to **Prof. Tao Xie** (Peking University) “for outstanding service contributions to the software engineering community, including substantial activities on SIGSOFT history, broadening participation in software engineering, and successful chairing of technical events”

ACM SIGSOFT Impact Paper Award

The Impact Paper Award goes to the ICSE 1999 paper “Patterns of Property Specifications for Finite-State Verification” by **Matthew B. Dwyer, George S. Avrunin, and James C. Corbett** “for enabling widespread use of temporal logic for program verification by raising the level of abstraction to common patterns”

ACM SIGSOFT Early Career Researcher Award

The ACM SIGSOFT Early Career Researcher Award goes to **Dr. Lingming Zhang** (University of Illinois at Urbana-Champaign) “for outstanding contributions to mutation testing, regression testing, fault localization, and program repair”

ACM SIGSOFT Outstanding Doctoral Dissertation Award

The ACM SIGSOFT Outstanding Doctoral Dissertation Award goes to **Dr. August Shi** (now University of Texas at Austin) for his Dissertation “Improving Regression Testing Efficiency and Reliability via Test-Suite Transformations” (University of Illinois at Urbana-Champaign, advisor: Darko Marinov)

ACM SIGSOFT Frank Anger Memorial Award

The ACM SIGSOFT Frank Anger Memorial Award goes to Ms. **Sumaya Almanee** (UC Irvine)

IEEE Awards

Harlan D. Mills Award

The Harlan Mills Award goes to **Prof. Dieter Rombach** in recognition of his outstanding contributions and leadership in research, teaching, and technology transfer in the area of empirical software engineering.

IEEE CS TCSE Distinguished Women in Science & Engineering (WISE) Leadership Award

The IEEE CS TCSE Distinguished WISE Leadership Award goes to **Professor Sue Black** (Durham University) “for creating highly recognized and sustained programs to help women, who are not originally related to computing and technology, develop the required skills to pursue their dreams and improve their quality of lives through computer science and software engineering career paths. The impact she has generated by mentoring underprivileged women, and ever their children, is endless”.

IEEE CS TCSE New Directions Award

The IEEE CS TCSE New Directions Award goes to **Professor Yuriy Brun** (University of Massachusetts) “for setting a new direction in software engineering research by defining the area of software fairness testing. His advocacy for industrial uptake of software fairness testing has attracted both funding and opportunities for real-world impact, and charted a roadmap for software engineering research in this new area”.

IEEE CS TCSE Rising Star Award

The IEEE CS TCSE Rising Star Award goes to **Professor Federica Sarro** (University College London) “for her high-impact, industrially relevant research on predictive modeling for software engineering. In parallel to her research excellence, she has also made substantial contributions to the training of a large cohort of students, and to the development of improved curricula in support of this training”.

TIME CEST		Tuesday, May 25 th		(1/2)
LIVE	MIRROR			
11:30 – 12:00	23:30 – 00:00	NETWORKING	MEET YOUR PEERS	11:30 – 12:00 23:30 – 00:00 LIVE EVENT →
		In this series of speed networking events, ICSE participants can meet their academic peers		
		Human aspects		
		AI and software engineering (AI for SE, SE for AI)		
		Testing		
		Program analysis		
		Open (any topic)		
		Software evolution and maintenance		
Requirements, design, modeling				
14:45 – 15:15	02:45 – 03:15	MEET WITH	MEET DARÍO GIL	14:45 – 15:15 02:45 – 03:15 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		
		NETWORKING	INTRODUCTION TO GATHER.TOWN Chair: Fabiano Pecorelli, Davide Fucci, Carolin Brandt	14:45 – 15:15 02:45 – 03:15 MIRROR →
		NETWORKING	COST ACTION NETWORK ON GENDER BALANCE Chair: Valentina Lenarduzzi	14:45 – 15:15 MIRROR IN MAY 26 th (+32h) 22:45 – 23:15 MIRROR →
		Gender balance in Informatics, are we there yet? We are working to support and to achieve gender balance. Which is your experience? Please share with us!		
		NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	14:45 – 15:15 LIVE SCHEDULE ONLY →
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.		
16:15 – 16:35	04:15 – 04:35	HUAWEI	SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY 02:45 – 03:15 LIVE EVENT →
		Meeting SE Researchers at Huawei		
16:15 – 16:35	04:15 – 04:35	SOCIAL	GUITAR CONCERT	16:15 – 16:35 04:15 – 04:35 MIRROR →
		A live guitar micro concert (20 minutes) broadcasted by a colleague from the SE group at the Caceres University from the monumental ancient city of Caceres.		

TIME CEST		Tuesday, May 25 th		(2/2)	
LIVE	MIRROR				
19:00 – 19:30	07:00 – 07:30	MEET WITH	MEET PREM DEVANBU	19:00 – 19:30 07:00 – 07:30 MIRROR →	
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			
		NETWORKING	COMMUNITY SPEED NETWORKING	19:00 – 19:30 LIVE SCHEDULE ONLY →	
		In this series of speed networking events, ICSE participants can meet their peers. Speed Networking: Hablamos Español			
		NETWORKING	COFFEE CHAT	19:00 – 19:30 07:00 – 07:30 LIVE EVENT →	
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.			
		Women in Software Engineering Research			(19:00 – 19:30 and 07:00 – 07:30)
		Μιλάμε ελληνικά Eleni Constantinou			(19:00 – 19:30 ONLY)
		Falamos português! Igor Steinmacher			(19:00 – 19:30 ONLY)
		On parle français Fabio Petrillo			(19:00 – 19:30 ONLY)
		Parliamo italiano Valentina Lenarduzzi			(19:00 – 19:30 ONLY)
		Blacks in Software Engineering			(19:00 – 19:30 ONLY)
		Hablamos español José Miguel Rojas			(07:00 – 07:30 ONLY)
		NETWORKING	ICSE IS RUNNING Chairs: Luís Cruz, Ayushi Rastogi	19:00 – 19:30 07:00 – 07:30 MIRROR →	
		The first-ever virtual run event at ICSE! From 25-27, May 2021 AOE attendees from all over the world will run 5 km. Join us! #ICSE21isRunning			
		INVENIA LABS	OPPORTUNITIES AT INVENIA LABS	19:00 – 19:30 LIVE SCHEDULE ONLY →	
A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.					

TIME CEST		Wednesday, May 26 th			(1/3)
LIVE	MIRROR				
10:45 – 11:15	22:45 – 23:15	MEET WITH	MEET MICHAEL LYU	10:45 – 11:15 22:45 – 23:15 MIRROR	→
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			
		NETWORKING	COFFEE CHAT	10:45 – 11:15 22:45 – 23:15 LIVE EVENT	→
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.			
		Women in Software Engineering Research			
		Hablamos español			
		NETWORKING	MENTORING CIRCLE Chair: Abhik Roychoudhury	10:45 – 11:15 LIVE SCHEDULE ONLY	→
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.			
12:20 – 12:50	00:20 – 00:50	NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	10:45 – 11:15 LIVE SCHEDULE ONLY	→
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.			
		INVENIA LABS	OPPORTUNITIES AT INVENIA LABS	10:45 – 11:15 LIVE SCHEDULE ONLY	→
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.			
		FACEBOOK	MEET FACEBOOK RECRUITING & RESEARCH	MIRROR SCHEDULE ONLY 22:45 – 23:15 LIVE EVENT	→
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook			
		SOCIAL	FLAMENCO LESSON & PARTY 1	12:20 – 12:50 LIVE SCHEDULE ONLY	→
		An online Flamenco class and party that will immerse you in the cultural experience of flamenco. Read here to start preparing yourself for clapping and castanets (https://www.ishowusevilla.com/en).			

TIME CEST		Wednesday, May 26 th			(2/3)
LIVE	MIRROR				
15:30 – 16:00	03:30 – 04:00	NETWORKING	MEET YOUR PEERS	15:30 – 16:00 03:30 – 04:00 LIVE EVENT	→
		In this series of speed networking events, ICSE participants can meet their academic peers			
		Postdoctoral researchers			
		PhD students			
		Faculty			
		NETWORKING	AST INDUSTRIAL COMPETITION	15:30 – 16:00 LIVE SCHEDULE ONLY	→
18:15 – 18:45	06:15 – 06:45	This year the theme for AST is "Automatic Software Testing from the Trenches". In other to visualize the industrial orientation of the congress, an "industrial competition" for participants of AST 2021 will be organized. The idea is to give a very short presentation of accepted papers in AST to an industrial commission (only 3 to 5 minutes per author!) and they will select a winner analyzing its attractiveness to the industry.			
		NETWORKING	MENTORING CIRCLE Chair: Jonathan Bell (LIVE SCHEDULE), Gail Murphy (MIRROR SCHEDULE)	15:30 – 16:00 03:30 – 04:00 LIVE EVENT	→
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.			
		HUAWEI	SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY 03:30 – 04:00 LIVE EVENT	→
		Meeting SE Researchers at Huawei			
		MEET WITH	MEET ELAINE WEYUKER	18:15 – 18:45 06:15 – 06:45 MIRROR	→
18:15 – 18:45	06:15 – 06:45	Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			
		NETWORKING	COFFEE CHAT	18:15 – 18:45 06:15 – 06:45 LIVE EVENT	→
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.			
		Women in Software Engineering Research			
		Hablamos español			
		Blacks in Software Engineering			
		NETWORKING	WAIN'21 – 1 st WORKSHOP ON AI ENGINEERING – SOFTWARE ENGINEERING FOR AI Chair: Ivica Crnkovic	18:15 – 18:45 LIVE SCHEDULE ONLY	→
		WAIN'21 has brought researchers and practitioners in software engineering, data-science, and AI, to build up a community which is targeting new challenges emerging in software engineering – how to efficiently build software AI-enabled software systems.			
		NETWORKING	YOU MIGHT BE STUDYING TECHNICAL DEBT AND NOT KNOW IT Chair: Antonio Martini	18:15 – 18:45 LIVE SCHEDULE ONLY	→

TIME CEST		Wednesday, May 26 th (3/3)		
LIVE	MIRROR			
18:15 – 18:45	06:15 – 06:45	NETWORKING	MENTORING CIRCLE Chair: Tao Xie	MIRROR SCHEDULE ONLY 06:15 – 06:45 LIVE EVENT →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		FACEBOOK	FACEBOOK LAUNCHES NEW RESEARCH AWARD OPPORTUNITY	18:15 – 18:45 LIVE SCHEDULE ONLY →
		Join us for the launch of a research award opportunity for academia at ICSE! This request for proposals continues the research that the probability team at Facebook, led by Mark Harman, is doing to foster innovation in agent-based user interaction simulation.		

TIME CEST		Thursday, May 27 th		(1/2)
LIVE	MIRROR			
11:00 – 11:30		NETWORKING	TAKE A COFFEE WITH THE PROGRAM CO-CHAIRS OF ICSE 2021	11:00 – 11:45 LIVE SCHEDULE ONLY →
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!		
14:30 – 15:00	02:30 – 03:00	MEET WITH	MEET ANDREA ARCURI, LIONEL BRIAND	14:30 – 15:00 02:30 – 03:00 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		
		NETWORKING	COFFEE CHAT	14:30 – 15:00 02:30 – 03:00 LIVE EVENT →
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.		
		Women in Software Engineering Research		
		Hablamos español		
		NETWORKING	MENTORING CIRCLE Chair: Patricia Lago	14:30 – 15:00 LIVE SCHEDULE ONLY →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		NETWORKING	EUROPE NEEDS STRONG SOFTWARE RESEARCH Chair: Alexander Serebrenik	14:30 – 15:00 LIVE SCHEDULE ONLY →
		Software Engineering research is under-funded and many of us need to apply to programs targeting other topics such as cybersecurity, AI and blockchain. Joins us in requesting international and national funding agencies to acknowledge the importance of software for society and the need for increased funding of software research.		
Alexander Serebrenik, Paris Avgeriou, Jurgen Vinju, Marieke Huisman				
		INVENIA	OPPORTUNITIES AT INVENIA LABS	14:30 – 15:00 LIVE SCHEDULE ONLY →
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.		
		HUAWEI	SE RESEARCH @ HUAWEI	MIRROR SCHEDULE ONLY 02:30 – 03:00 LIVE EVENT →
		Meeting SE Researchers at Huawei		
16:05 – 16:25	04:05 – 04:25	SOCIAL	VIRTUAL TRIP TO MADRID	16:05 – 16:25 04:05 – 04:25 MIRROR →
		A colleague from the ICSE Organising Committee will broadcast live a 20 minutes walk to show you one of the tourist landmarks in Madrid: Plaza de Oriente		

TIME CEST		Thursday, May 27 th			(2/2)
LIVE	MIRROR				
18:45 – 19:15	06:45 – 07:15	MEET WITH	MEET JEANNETTE WING	18:45 – 19:15 06:45 – 07:15 MIRROR	→
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them			
		NETWORKING	LGBTIQ+ GROUP MEETING	18:45 – 19:15 LIVE SCHEDULE ONLY	→
		Lesbian, Gay, Bisexual, Transgender, Intersexual, and Questioning (LGBTIQ) researchers and practitioners primarily come to software engineering conferences to discuss technical aspects of their work with the research community. But we are people, too, whose rights and safety are sometimes affected by the political climate. At this year's group meeting, LBGTIQ researchers, practitioners, and friends are invited to speak together to build community. We will also discuss how we fit in with our academic, industry, and governmental institutions, the current political climate around the world, and what we can do to help make all software engineering conferences and workshops to be safe and welcoming spaces for LBGTIQ members of the Software Engineering research community.			
		NETWORKING	COFFEE CHAT	18:45 – 19:15 06:45 – 07:15 LIVE EVENT	→
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.			
		Women in Software Engineering Research			
		Hablamos español			
20:15 – 20:45	08:15 – 08:45	NETWORKING	MENTORING CIRCLE Chair: Thomas Zimmermann (<i>LIVE SCHEDULE</i>), Julia Rubin (<i>MIRROR SCHEDULE</i>)	18:45 – 19:15 06:45 – 07:15 LIVE EVENT	→
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.			
		NETWORKING	MEET FACEBOOK RECRUITING & RESEARCH	18:45 – 19:15 LIVE SCHEDULE ONLY	→
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook			
		NETWORKING	COMMUNITY SPEED NETWORKING	20:15 – 20:45 LIVE SCHEDULE ONLY	→
		In this series of speed networking events, ICSE participants can meet their peers.			
		LGBTIQ+ Andrew Begel			
		Blacks in Software Engineering			
		Women in Software Engineering			
		NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	20:15 – 20:45 LIVE SCHEDULE ONLY	→
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.			

TIME CEST		Friday, May 28 th (1/2)		
LIVE	MIRROR			
10:55 – 11:25	22:55 – 23:25	NETWORKING	TAKE A COFFEE WITH THE OPEN SCIENCE CHAIR OF ICSE 2021	10:55 – 11:25 LIVE SCHEDULE ONLY →
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!		
		NETWORKING	MENTORING CIRCLE Chair: Lars Grunske	10:55 – 11:25 LIVE SCHEDULE ONLY →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		HUAWEI	SE RESEARCH @ HUAWEI	10:55 – 11:25 LIVE SCHEDULE ONLY →
		Meeting SE Researchers at Huawei		
12:30 – 13:00	00:30 – 01:00	FACEBOOK	MEET FACEBOOK RECRUITING & RESEARCH	MIRROR SCHEDULE ONLY 22:55 – 23:25 LIVE →
		Join Ph.D and Infrastructure recruiters to learn about the research and opportunities available at Facebook		
		NETWORKING	MEET YOUR PEERS	12:30 – 13:00 00:30 – 01:00 LIVE EVENT →
		In this series of speed networking events, ICSE participants can meet their academic peers		
		We love dogs		
		We love cats		
14:30 – 15:00	02:30 – 03:00	We Love other pets		
		No pets		
		NETWORKING	ICSE IS RUNNING Chairs: Ayushi Rastogi, Luís Cruz	12:30 – 13:00 00:30 – 01:00 MIRROR →
		The first-ever virtual run event at ICSE! From 25-27, May 2021 AOE attendees from all over the world will run 5 km. Join us! #ICSE21isRunning		
		MEET WITH	MEET DIETER ROMBACH	14:30 – 15:00 02:30 – 03:00 MIRROR →
		Do you want to have the opportunity to meet and chat with the Keynotes and main Awardees from ICSE 2021? We are more than sure that after their interesting and inspired talks, you would have a lot of questions and comments for them, so join their corresponding sessions to get the chance of meeting and chatting with them		

TIME CEST		Friday, May 28 th		(2/2)
LIVE	MIRROR			
14:30 – 15:00	02:30 – 03:00	NETWORKING	COFFEE CHAT	14:30 – 15:00 LIVE SCHEDULE ONLY →
		If we were meeting in person, there would be conversations around coffee tables in many different languages. To imitate this informal interaction we organise a series of chat room meetings in different languages.		
		Women in Software Engineering Research		
		Hablamos español		
		NETWORKING	MENTORING CIRCLE Chair: Diomidis Spinellis	14:30 – 15:00 LIVE SCHEDULE ONLY →
		ICSE 2021 will run a series of mentoring circles each led by senior software engineering researcher. Every mentoring circle has limited capacity (up to 10 mentees). The conversation can touch on any subject, and address any challenge experienced by the mentees. This is a limited-capacity by registration only event.		
		INVENIA	OPPORTUNITIES AT INVENIA LABS	14:30 – 15:00 LIVE SCHEDULE ONLY →
		A chance to network with members of the Invenia Labs team and ask questions about what Invenia is working on.		
16:05 – 16:35	04:05 – 04:35	NETWORKING	YOGA AND BREATHWORKS Chair: Birgit Penzenstadler	16:05 – 16:35 LIVE SCHEDULE ONLY →
		The yoga sessions are short introductory sessions to pranayama (working with the breath), asana (stretching), and meditation. No prior knowledge required - put on some comfy clothes and find a space to relax in.		
		NETWORKING	TAKE A COFFEE WITH THE PROGRAM CO-CHAIRS OF ICSE 2022	16:05 – 16:35 LIVE SCHEDULE ONLY →
		Are you interested on the tasks done by the ICSE Organizing Committee? Do you want to ask questions, discuss different points of view or share ideas regarding different tasks associated to the ICSE Organizing Committee roles in a relaxed environment? Come and take a coffee with some of the OC members!		
		NETWORKING	ICPC Chair: Alexander Serebrenik	16:05 – 16:35 LIVE SCHEDULE ONLY →
The ICPC event is video presenting the program comprehension community to the broader ICSE audience. We interview several junior and senior researchers working on different aspects of program comprehension and introduce the upcoming edition of ICPC!				
18:30 – 19:30	06:30 – 07:30	NETWORKING	TOWN HALL Chairs: Thomas Zimmermann, Ladan Tahvildari	18:30 – 19:30 06:30 – 07:30 MIRROR →
		Learn more about the activities of IEEE TCSE and ACM SIGSOFT. Discuss issues and share ideas on how to improve the Software Engineering community.		
20:30 – 21:00	08:30 – 09:00	SOCIAL	FLAMENCO LESSON & PARTY 2	20:30 – 21:00 LIVE SCHEDULE ONLY →
		An online Flamenco class and party that will immerse you in the cultural experience of flamenco Read here to start preparing yourself for clapping and castanets (https://www.ishowusevilla.com/en).		



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