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SenSys '19

Proceedings of the 17th

Conference on Embedded Networked Sensor Systems

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The Association for Computing Machinery
2 Penn Plaza, Suite 701
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Edited by
Mi Zhang (Michigan State University, USA)

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Message from General Chairs

Welcome to the 17th ACM Conference on Embedded Networked Sensor Systems (SenSys 2019) and welcome to New York City! We are excited to host it this year in the technology hub of East Coast United States and hope that you enjoy the discussions around the various topics of networked sensing systems. This year, Columbia University and IBM T J Watson Research Center are jointly hosting SenSys in New York City, the "melting pot" of the United States that is ethnically and culturally diverse. NYC is also the financial, cultural, and media capital of the world, with unique sights such as Central Park, an array of world class museums, some of the best restaurants in the world, Broadway shows, and the list goes on. We hope that the attendees will enjoy the unique and rich culture of NYC during their stay at the conference.

We continue to have a highly selective program with papers in various technical areas. Similar to the previous years, BuildSys is co-located with SenSys, allowing participants to attend both world-class conferences and intermingle with these communities. We have many high quality workshops hosted at SenSys covering areas such as AI and ML, energy harvesting, data acquisition to analysis, and blockchain; to name a few. Jointly with BuildSys, we have a poster and demo session on Day 3. This year, we have the pleasure of hosting the N2W workshop for women in networking and a unique tutorial on an advanced wireless testbed for research, COSMOS.

We are glad to have a wonderful and dedicated team that helped put together this exciting conference in the heart of New York City. First and foremost are the TPC Chairs, Gian Pietro Picco and Xia Zhou, who have put together an exciting and selective program. We would like to extend special thanks to the finance chairs, Rui Tan and Tam Vu, who have been extremely diligent and innovative to keep the conference expenses manageable. The local arrangements chair, Tingjun Chen, was instrumental in arranging the necessary logistics for the conference to be successful. The workshop chairs, Akshay Uttama Nambi and Chenren Xu, put together a very exciting set of workshops including those on AI/ML, the first of their kind at SenSys. The poster and demo chairs, Yeon-sup Lim and Shahriar Nirjon, have put together a session that we expect to be abuzz with activity, especially as a joint poster/demo session with Buildsys. We continue the tradition of hosting PhD students for obtaining feedback through a PhD forum, hosted by Ramya Raghavendra and Niki Trigoni. The publicity chair, Shijia Pan and social media chairs, Hyung-sin Kim and Desheng Zhang ensured the visibility of SenSys and engaged the audience. We are also grateful for the student travel grants chairs, Polly Huang and Lu Su for successfully enabling students to travel to SenSys from within and outside the US. Last, but not least, Stephen Xia, the web chair and Mi Zhang, the publication chair are due many thanks for taking on the painstaking job of keeping the website up to date and herding the authors to keep their publications in line with the timeline and ACM requirements. We would also like to thank the Steering Committee of SenSys, who provided their able guidance for making this year's SenSys successful. Finally, without the attendees of SenSys, we would not have a conference to begin with, and we would like to extend our thanks to all those who have attended SenSys.

SenSys is made possible every year by the sponsorship of ACM Special Interest Groups (SIGs): SIGCOMM, SIGMOBILE, SIGARCH, SIGOPS, SIGMETRICS and SIGBED. The National Science Foundation (NSF) and SIGMOBILE provided a number of travel awards, making it possible for many students to attend the conference. We also acknowledge the financial and logistical support from Columbia University Data Science Institute, IBM Research, Johnson Controls, Fu Foundation School of Engineering and Applied Sciences, Columbia University Department of Electrical Engineering, AiFi, and Bosch.

On behalf of the entire organizing committee, we hope you enjoy the conference!

SenSys 2019 General Chairs: Raghu K. Ganti *(IBM Research, USA)*
Xiaofan (Fred) Jiang *(Columbia University, USA)*

Message from Program Chairs

Welcome to the 17th ACM Conference on Embedded Networked Sensor Systems (SenSys 2019), a leading single-track scientific venue focusing on advancements in research fields at the cross-roads of sensing and wireless networking. SenSys focuses on all aspects of system design, development, deployment, and use of networked sensing systems, therefore covering the whole gamut of topics ranging from the computation and communication hardware up to the application layer (e.g., including machine learning approaches). As such, it is an ideal venue to disseminate and discuss recent developments in the field, as witnessed by his history of active participation from both academia and industry. This year, the conference proceedings are no exception: among the very high-quality papers focusing on different facets of networked sensing you will likely find new inspiration for your own scientific and professional achievements.

The papers included in the proceedings have been selected via a rigorous multi-stage review process by a Technical Program Committee (TPC) that consisted of 45 world-class experts. Following the process of the last two editions, the TPC was divided in two: the External TPC, whose 21 members only provided reviews during the first stage, and the Main TPC, whose 24 members instead participated in all stages of the review process, notably including the final in-person discussion at the TPC meeting. Submissions were required to be anonymized, yielding a double-blind review process that preserved the anonymity of both authors and reviewers. The 144 submissions underwent a first round of review by at least 3 TPC members, followed by online discussion via the HotCRP conference management system. This enabled the first selection, advancing to the next stage only the 93 papers (64%) that had at least one supportive reviewer. During the second round of review, at least 2 additional Main TPC members reviewed each submission, therefore providing a stronger base to ascertain its technical quality. In both rounds, the TPC chairs also occasionally solicited reviews from experts outside the TPC, when required by the peculiarity of the techniques and/or topics of the submission at hand. At the end of the second stage, another online discussion selected the 51 papers (54% of those in round 2, 35% of the total) to be discussed during the face-to-face TPC meeting. The meeting took place on July 18, 2019 at Columbia University in New York (USA). Physical co-location proved very effective, allowing Main TPC members to discuss in depth the strengths and weaknesses of each submission. After the full-day meeting, 28 papers (54% of those under discussion) were conditionally accepted for inclusion in the final program. Each paper was assigned an anonymous shepherd, who supervised the revision necessary to address the comments by the reviewers and TPC at large, before preparation of the camera-ready version. All these papers were eventually accepted, yielding an overall acceptance rate of 19.4%.

The above shows that the paper selection process has been a collective effort by many dedicated volunteers. We are deeply thankful to the TPC members, who provided timely and in-depth reviews for a high number of submissions, and in particular to those who also served as shepherds, a role crucial in ensuring an even higher quality of the published papers. At the same time, we also want to thank authors, who contributed outstanding work and patiently worked with shepherds to address the review comments. We also would like to thank the conference General Chairs, Raghu Ganti and Xiaofan (Fred) Jiang, for their input and support with logistics and many other matters throughout the conference organization. Finally, we thank the conference attendees, for making this venue a place where lively discussions and creative exchange advance the state of the art.

We hope that these proceedings will sparkle many of these personal and research interactions, by providing a high-quality, diverse, and thought-provoking technical program; we sincerely wish you to enjoy the conference and look forward to meeting you all in New York!

SenSys 2019 Program Chairs: Gian Pietro Picco *(University of Trento, Italy)*
Xia Zhou *(Dartmouth College, USA)*

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