PACIFIC SYMPOSIUM ON BIOCOMPUTING 2020

2020 marks the 25th Pacific Symposium on Biocomputing (PSB), and this year’s meeting is again full of outstanding new results in cutting edge research areas. Our conference remains vibrant after a quarter century because we depend on the research community to identify emerging areas in biomedical computation. Topics span the full range of biomedicine, from genomics through proteins to clinical care. The PSB community continues to innovate in the application of AI, machine learning and pattern recognition to critical problems in biology and medicine. Just as importantly, the PSB peer review community insists on a realistic understanding of the capabilities of emerging technologies. It is our duty to continue applying appropriate pressure on ourselves to test the real-world utility of these techniques, figure out how to optimize their use for problems in biology and medicine, and ensure that we contribute to a scholarly literature that realistically portrays the power and the limitations of emerging technologies. Our focus on emerging scientific questions and methodologies is a clear strength of the conference, and one that ensures the meeting remains relevant as the technology we have long explored expands throughout biomedical research and clinical care.

The origins of PSB go back more than 27 years when Larry Hunter ran a very popular Biotechnology session as part of the Hawaii International Conference on System Science (HICSS). HICSS continues to be a success and is now in its 53rd year. Larry ran such a diverse session, that people from computer science to biology, gathered to discuss methods and applications. (Sound familiar?) It was here that Larry presented a machine learning method that Teri Klein realized could be applied to her research on the molecular basis of disease, specifically the collagen disorder, Osteogenesis Imperfecta. They became collaborators as well as friends. Following the second year of the Biotechnology track at HICSS, Larry and Teri realized that if they wanted to continue to have a symposium that brought people from diverse backgrounds together that they would have to create a new conference from scratch. While blowing bubbles on a foldout couch at Teri’s home with her then, five and seven year old children (Jackson and Kasey), Larry and Teri (with the help of Teri’s husband Dennis), came up with the type of symposium they wanted: NO parallel sessions, located in the Pacific, and with ample time for scientists to sit around and discuss science and life. Now for the name and it also had to have a catchy acronym. All kinds of acronyms were tried, with many thrown out (e.g., PBS – somehow that was already taken), so PSB was chosen, and the Pacific Symposium on Biocomputing was created. The plan initially was to have the conference move around the Hawaiian Islands (which was the case for many years) and then maybe to Singapore or Mexico – all connected by the Pacific Ocean. However, there’s no place like home and the Fairmont Orchid on the Big Island of Hawaii has become the beloved home of PSB.

To Larry’s credit, and Teri’s negotiation skills, PSB has ALWAYS made the PSB proceedings available online for free. Doesn’t necessarily seem novel in 2020, but in 1996, this was unheard of. Teri and Larry managed to put together the first year of PSB in less than nine months including securing a NIH NLM conference grant for travel awards for minorities, women, students, and post-docs. This grant continues to support PSB paper authors for travel to the symposium. In the second year of PSB, Teri recruited Keith Dunker to manage the grant and Russ Altman to handle the paper submission and review process. About five years ago, Marylyn Ritchie was recruited to help with fundraising for PSB.

Building on the HICSS model, PSB sessions are often conceived at the previous PSB meeting as people discuss trends and opportunities for new science. The typical program includes sessions that evolve over two to three years as well as entirely new sessions. This year, we revisit topics such as precision medicine and pattern recognition, while nurturing emerging interest in mutational signatures, disordered proteins and other topics.

In addition to being published by World Scientific and indexed in PubMed, the proceedings from all PSB meetings are available online at http://psb.stanford.edu/psb-online/. PSB has 1166 papers listed in PubMed (as of today). These papers are routinely cited in archival journal articles and often represent important early contributions in new subfields—many times before there is an established literature in more traditional journals; for this reason, many papers have garnered hundreds of citations.

The Twitter handle PSB 2020 is @PacSymBiocomp and the hashtag this year will be #psb20.

The efforts of a dedicated group of session organizers have produced an outstanding program. The sessions of PSB 2020 and their hard-working organizers are as follows:
Human Intelligence for Enhancing Clinical Medicine
Organizers: Roxana Daneshjou, Olga Afanasiev, Lukasz Kidziński, Jonathon Chen

Intrinsically Disordered Proteins (IDPs) and Their Functions
Organizers: A. Keith Dunker, Lukasz Kurgan, Predrag Radivojac, Joel L. Sussman

Mutational Signatures
Organizers: Max Leiserson, Teresa Przytycka, Roded Sharan

Pattern Recognition in Biomedical Data: Challenges in Putting Big Data to Work
Organizers: Brett Beaulieu-Jones, Christian Darabos, Dokyoon Kim, Shilpa Kobren, Anurag Verma

Precision Medicine: Addressing the Challenges of Sharing, Analysis, and Privacy at Scale
Organizers: Steven Brenner, Martha Bulyk, Dana Crawford, Alexander Morgan, Predrag Radivojac, Nicholas Tatonetti

We are also pleased to present four workshops in which investigators with a common interest come together to exchange results and new ideas in a format that is more informal than the peer-reviewed sessions. For this year, the workshops and their organizers are:

AI Ethics and Values in Biomedicine – Technical Challenges and Solutions
Organizers: D. Petkovic, L. Kobzik, R. Ghanadan

Can the Circle Be Squared? Navigating Ethical Quandaries with the Privacy Dilemma of Biomedical Datasets
Organizers: Gamze Gursoy, Megan Doerr, Steven E. Brenner, Haixu Tang

Packaging Biocomputing Software to Maximize Distribution and Reuse

Translational Bioinformatics Workshop: Biobanks in the Precision Medicine Era
Organizers: Jason Moore, Ju Han Kim, Marylyn Ritchie

The PSB 2020 keynote speakers are Carole Goble (Science keynote) and Ifeoma Ajunwa (Ethical, Legal and Social Implications keynote).

Tiffany Murray has managed the peer review process and assembly of the proceedings since 2001, and plays a key role in many aspects of the meeting. We are grateful for the support of the Cleveland Institute for Computational Biology; UPenn Institute for Biomedical Informatics; Variant Bio; and the Penn Center for Precision Medicine, Penn Medicine for their support of PSB 2020. We also thank the National Institutes of Health¹ and the International Society for Computational Biology (ISCB) for travel grant support. The Research Parasite Awards benefit from support from GigaScience, Jeff Stibel, Mr. and Mrs. Stephen Canon, and Drs. Casey and Anna Greene. The Research Symbiont Awards benefit from support from Springer-Nature and the DragonMaster Foundation.

We are particularly grateful to the onsite PSB staff Al Conde, Paul Murray, Ryan Whaley, Mark Woon, BJ Morrison-McKay, Cynthia Paulazzo, Jackson Miller, Kasey Miller and Nicholas Murray for their assistance. We also acknowledge the many busy researchers who reviewed the submitted manuscripts on a very tight schedule.

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The partial list following this preface does not include many who wished to remain anonymous, and of course we apologize to any who may have been left out by mistake.

We look forward to a great meeting once again. Aloha!

Pacific Symposium on Biocomputing Co-Chairs, 
October 9, 2019

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Thanks to the reviewers…
Finally, we wish to thank the scores of reviewers. PSB aims for every paper in this volume to be reviewed by three independent referees. Since there is a large volume of submitted papers, paper reviews require a great deal of work from many people. We are grateful to all of you listed below and to anyone whose name we may have accidentally omitted or who wished to remain anonymous.

Olga Afanasieva  Tunca Doğan  Arjun Krishnan  Rosario Piro
Rocky Aikens  Mohammed El-Kebir  Bill Lacava  Sandhya Prabhakaran
Fadhil Alakwaa  Anat Etzion-Fuchs  Tran Le  Teresa Przytycka
Emily Alsentzer  Gilbert Fuchs  Mark Leiserson  Xiaoning Qian
Bruce Aronow  Sam Finlayson  Ben Lengerich  Predrag Radiovic
Zain Asgar  Stephanie M. Fullerton  Koby Levy  Vijendra Ramllall
Omid Aziz  Marzyeh Ghassemi  Huijuan Li  Barak Raveh
Elisar Barbar  Rajarshi Ghosh  Li Li  Zhiyun Ren
Brett Beaulieu-Jones  Mario Giacobini  Ron Li  Marylyn Ritchie
Afshin Beheshti  Nicholas Giangreco  Ruowang Li  Pedro Romero
Cosmin Bejan  Ben Glicksberg  Shantao Li  Venkata Satagopam
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Valentina Boeva  Max Gordon  Thomas Lohr  Avner Schlessinger
Mary Borland  Ananth Grama  Hui Lu  Robert Schneider
Lodewijk Brand  Emily Groopman  Jose Lugo-Martinez  Russell Schwartz
William Bush  Joerg Gsponer  Yves Lussier  Roland Schwarz
Tiffany Callahan  Dan Guo  Olga Lyudovik  Jun Seita
David Carrell  Gamze Gursoy  Matthew Maenner  Shayan Shams
Hannah Carter  Jacob Hall  Parag Mallick  Li Shen
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Hue Sun Chan  Lichy Han  Florian Markowitz  Pavel Skums
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Anna Cichonska  Ting Hu  Quaid Morris  Vladimir Uversky
Trevor Cohen  Ting Huang  Seyed Mousavi  Anurag Verma
Jessica Cooke Bailey  Rachel Jackson  Amy Mueller  Shefali Verma
Shilpa Corben  Suraj Jaladanki  Girish Nadkarni  Francesca Vitali
Connor Corbin  Dan Jarosz  Tristan Naumann  Haohan Wang
Orkid Coskuner  Antonio Jimeno  Allen Nie  Tao Wang
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James Costello  Travis Johnson  Keith Nykamp  Joshua Wetzel
Dana Crawford  Tomi Jun  Ross O'Hagan  Scott Williams
Israel da Silva  Mingon Kang  Layla Oesper  Damian Wojtowicz
Yulin Dai  Pradeepan Kathiravathu  Christopher Oldfield  Dong Xu
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Dason Data  Saad Khan  Gustavo Parisi  Shihao Yang
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Spiros Denaxas  Benjamin Kompa  Bethany Percha
Devendra Dhami  Birthe Brandt  Stephen Pfohl

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