In Loving Memory of

Lucas Benjamin Arsenault

February 16, 2021 – August 2, 2023

PACIFIC SYMPOSIUM ON BIOCOMPUTING 2024

2024 marks the 29th Pacific Symposium on Biocomputing (PSB). We gather once again on the Big Island to share the latest progress and challenges in biocomputing. 2023 was a year of remergence for Artificial Intelligence (AI). Large language models (LLMs) and particularly ChatGPT brought AI into the public consciousness in a way not previously seen. At the same time, advances in AI have fueled great progress in the analysis of structural and functional molecular data, omics data sets, electronic health records, biobanks, and many other areas of biocomputation. LLMs themselves have clear applications in both clinical medicine and in basic research, and we are experiencing an explosion of creative uses of these powerful (but still imperfect) tools. In addition to LLMs for human language, there are powerful LLMs built on protein and DNA sequence which show remarkable utility in representing these molecules and detecting signals and correlations between sequence and structure/function. These areas provide a rich background for PSB 2024. Of course, not all biocomputing is AI and there is still need for important efforts in traditional algorithms, informatics, data science, statistics and (importantly) in the understanding of the social setting in which our tools are used. We are more aware than ever that the choice of problems to address, the representativeness of the data that we use, and the ways we evaluate the success of our computational artifacts should all be considered with intention and sensitivity to considerations of justice, autonomy, beneficence, and non-maleficence.

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/. Since 1996, all PSB papers are indexed in PubMed. These papers are routinely cited in archival journal articles and routinely 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 social media handle for PSB is @PacSymBiocomp and the hashtag for PSB 2024 is #PSB24.

The efforts of a dedicated group of session organizers have produced an outstanding program. The sessions of PSB 2024 and their hard-working organizers are as follows:

Artificial Intelligence in Clinical Medicine: Generative and Interactive Systems at the Human-Machine Interface
Organizers: Sajjad Fouladvand, Emma Pierson, Ivana Jankovic, David Ouyang, Jonathan H. Chen, Roxana Daneshjou

Digital Health Technology Data in Biocomputing: Research Efforts and Considerations for Expanding Access
Organizers: Jessilyn Dunn, Michelle Holko, Chris Lunt

Drug-Repurposing and Discovery in the Era of "Big" Real-World Data: How the Incorporation of Observational Data, Genetics, and Other -omic Technologies Can Move Us Forward
Organizers: Megan M. Shuey, Jacklyn N. Hellwege, Nikhil Khankari, Marijana Vujkovic, Todd L. Edwards

Overcoming Health Disparities in Precision Medicine
Organizers: Francisco M. De La Vega, Kathleen C. Barnes, Keolu Fox, Alexander Ioannidis, Eimear Kenny, Rasika A. Mathias, Bogdan Pasaniuc

Precision Medicine: Innovative Methods for Advanced Understanding of Molecular Underpinnings of Disease
Organizers: Yana Bromberg, Hannah Carter, Steven E. Brenner

We are also pleased to present five 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:

Large Language Models (LLMs) and ChatGPT for Biomedicine
Organizers: Zhiyong Lu, Steven E. Brenner, Cecilia Arighi

Practical Approaches to Enhancing Fairness, Social Responsibility and the Inclusion of Diverse Viewpoints in Biomedicine
Organizers: Daphne O. Martschenko, Nicole Martinez-Martin, Meghan Halley

Risk prediction: Methods, Challenges, and Opportunities
Organizers: Rui Duan, Lifang He, Ruowang Li, Jason H. Moore

Statistical Analysis of Single-Cell Protein Data
Organizer: Brooke Fridley

Tools for Assembling the Cell: Towards the Era of Cell Structural Bioinformatics
Organizers: Emma Lundberg, Trey Ideker, Andrej Šali

The PSB 2024 keynote speakers are Scott Penberthy (Science keynote) and Andrea Roth (Ethical, Legal and Social Implications keynote).

We look forward to a great meeting and to seeing you on the Big Island. Aloha!

Pacific Symposium on Biocomputing Co-Chairs,
October 9, 2023

Russ B. Altman
Departments of Bioengineering, Genetics, Medicine & Biomedical Data Science, Stanford University

Lawrence Hunter
Department of Pharmacology, University of Colorado Health Sciences Center

Marylyn D. Ritchie
Department of Genetics and Institute for Biomedical Informatics, University of Pennsylvania

Teri E. Klein
Departments of Biomedical Data Science & Medicine, Stanford University

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.

Tiffany Amariutta
Marcus Bagedley
Nuno Bandeira
Chinmayi Bankar
Alfonso Barajas
Kathleen Barnes
Joshua Barrios
Kyle Beauchamp
Michael Beer
Jamie Bennett
Erik Bergstrom
Shreyas Bhave
Alexander Bick
Nathaniel Bloodworth
Yana Bromberg
Dan Brown
Andrew Carroll
Hannah Carter
Jin Chen
Yile Chen
Min Chiu
Young-Rae Cho
Min Choi
Andrew Cirincione
Wyatt Clark
Joseph Colonel
Hejie Cui
Matteo D'Antonio
Roxana Daneshjou
Jishnu Das
Francisco De La Vega
Clara De Paolis Kaluza
Roozbeh Dehghannasiri
Yi Ding
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Dominik Heider
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Alexander Ioannidis
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Predrag Radivojac
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