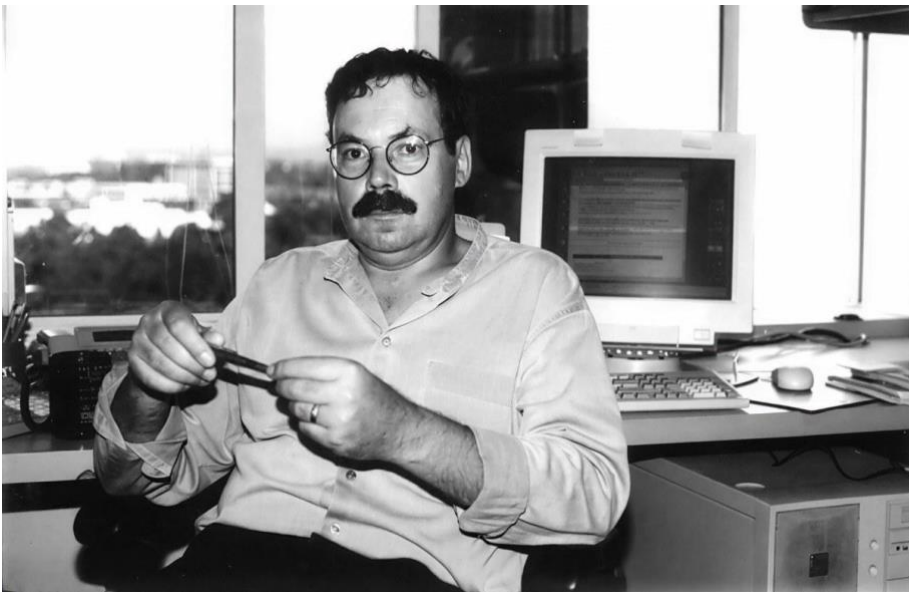


In Memory of our dear friend & colleague

Phil Bourne

22 March 1953 – 8 March 2026



Bye for now...

PACIFIC SYMPOSIUM ON BIOCOMPUTING 2027

2027 marks the 32nd Pacific Symposium on Biocomputing (PSB)! The AI revolution continues and offers both amazing potential to accelerate scientific discovery as well as real challenges. Consider the PSB conference; after many years with manuscript submissions numbering from 85 to 120, the submissions jumped to more than 150 manuscripts. Of course, part of this could be the outstanding efforts of our session organizers to encourage submissions, but it is also clear that AI is having effects. First, AI agents and coding tools greatly facilitate progress in answering scientific questions in our field. The quality of AI coding tools has increased over this last twelve months, and we may be seeing the anticipated increase in scientific productivity. Second, large language models have made it easier to outline, draft and even write scientific papers, and have also made it easier to create figures and tables. Putting these two advances together, we get increased ability to do work and write it up. Thanks to the work of our session organizers, we were able to implement our normal peer review process (with a median of three reviews per paper, all by humans). However, it is possible that the peer review system will be stressed in coming years, as the scientific productivity of our field continues to increase. This is not just an issue for PSB, but for the entire scientific enterprise. Science relies on careful and high-quality peer review to evaluate new theories, methods and findings. If the peer review system fails, then trust in science will (and should) be reduced. Ironically, it is likely that AI itself will be part of the solution to more efficient and effective peer review. There are some experiments in AI peer review but they are nascent; for example, some conferences are testing additional AI-created reviews. The challenges for quality peer review in biocomputing are myriad, because it combines the rapidly advancing fields of computation, statistics, machine learning and AI with the complex, context-dependent and contingent knowledge that characterizes biology. Ensuring that peer review remains robust is mission critical.

As always, the sessions and workshops in this year's PSB present exciting and emerging work combining computing technologies and the biosciences. This volume presents the peer reviewed proceedings for your enjoyment. 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 2027 is #PSB27.

The efforts of a dedicated group of session organizers have produced an outstanding program. The sessions of PSB 2027 and their hard-working organizers are as follows:

AI and Machine Learning in Clinical Medicine: From Research to Real-World Deployment

Organizers: Fateme Nateghi Haredasht, David Wu, David JH Wu, Austin Schoeffler, Kameron C. Black, Dokyoon Kim, Joseph Romano, Geoffrey Tison, Brett Beaulieu-Jones

Biological Molecular Function: Beyond Homology

Organizers: Jason McDermott, Yana Bromberg, Hannah Carter, Travis Wheeler

NLP Methods for Embedding Real-World Clinical Knowledge in LLMs: Towards Responsible, Transformative Medical AI

Organizers: Graciela Gonzalez-Hernandez, Carl Berdahl, Brian Chapman, Wendy Chapman, Sumeet Chugh, Ian Campbell, Timothy Daskivich, Hongfang Liu, Abeed Sarker, Davy Weissenbacher

Precision Medicine: Computational and AI Approaches for Understanding the Biological Basis of Health and Disease

Organizers: Tayo Obafemi-Ajayi, Nilah Ioannidis, Mohamed Omar, Steven E. Brenner

Sociotechnical Ethnography in Health Informatics: Bridging Technology, Practice, and Human Experience

Organizers: Kevin B. Johnson, Andrea L. Hartzler, Karen O'Connor

Systems Biology and Network Analysis: From Multi-Omics Integration to Causal and Mechanistic Understanding

Organizers: Gurkan Bebek, Rachael Hageman Blair, Filipa Blasco Tavares Pereira Lopes, Joshua Welch, Onur Mutlu, Serguei Pakhomov

We are excited 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:

The Art of Scientific Surprise: Using Humor, Magic, and Art to Enhance Communication and Thinking

Organizers: Jason McDermott, Jonathan Chen

Digital Health and Precision Medicine in Reproductive Health in the AI Era: Data, Methods, and Translation from Real-World Data to Equitable Clinical Impact

Organizers: Shefali Setia Verma, Samantha Piekos, Tomiko Oskotsky, Roxana Daneshjou, Digna R. Velez Edwards, Marina Sirota

From Infrastructure to Impact: Developing Actionable Solutions and Community Challenges in Biomedical Cyberinfrastructure

Organizers: Sean D. Mooney, Nick Weber, Timothy J. Hohman, Sarah Biber

Multi-modal Spatial-Omics: From AI Models to Translational Applications

Organizers: Lana Garmire, Ben Raphael, Xiuwei Zhang, Cong Ma

Next-Generation Biocomputing Doctoral Training in the Era of AI

Organizers: Graciela Gonzalez-Hernandez, Steven E. Brenner

The PSB 2027 keynote speakers are Chirag Patel (Science Keynote) and Michelle Mello (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 long-time support of the National Institutes of Health¹, ISCB, and the National Science Foundation². 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 the Wellcome Trust and the DragonMaster Foundation.

We are particularly grateful to the PSB staff Tiffany Murray, Al Conde, Ryan Whaley, Mark Woon, Liam Mulhall, Nicholas Murray, BJ Morrison McKay, Cynthia Paulazzo, George Powell, Jackson Miller, and Michelle Schaal for their assistance. We also acknowledge the many busy researchers who reviewed the submitted manuscripts on a very tight schedule. 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 and to seeing you on the Big Island. Aloha!

Pacific Symposium on Biocomputing Co-Chairs,
October 12, 2026

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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.

Haneen Abderrazzaq	Aleysha Chen	Graciela Gonzalez-
Jose Acitores	Feng Chen	Hernandez
Agnideep Aich	Jingqi Chen	Sara Gosline
Rahaf Al Assil	Sandy Chen	Maxime Griot
Basam Alasaly	Jingya Cheng	Andrew Guo
Giuseppe Albi	Wonyoung Cheon	Lin Lawrence Guo
Tiffany Amariuta	Hyunjun Choi	Yuting Guo
Marcy Antonio	Sutanay Choudhury	Rachael Hageman Blair
Gayan Mend Mend	Gillian Chu	JaMor Hairston
Arachchige	Ann Cirincione	Yun Hao
Derek Archer	Mike Conway	Steven Hart
Negin Ashrafi	James Costello	Dominik Heider
Sylvan Baca	Mustafa Coşkun	Oresta Hewryk
Bharath Kumar	David Craig	Hanna Hieromnimon
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Jay Bardhan	Jishnu Das	William Hou
Brett Beaulieu-Jones	Sudeshna Das	Yi-Wen Hsiao
Gurkan Bebek	Trent Davis	Zhijian Hu
Mike Beer	Clara De Paolis Kaluza	Heyuan Huang
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 Luyang Luo
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 Salem Malikic
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 Bryan Tegomoh
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 Colby Uptegraft
 Priyanka Vasanthakumari
 Mythreye Venkatesan
 Rasika Venkatesh
 Alejandro Alexei Vistorte
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 Moomna Waheed
 Chase Walton
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 Davy Weissenbacher
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