2017 marks the 22nd Pacific Symposium on Biocomputing (PSB)! Biocomputing, biomedical informatics and data science have become high profile activities in recent years. The associated emphasis on the need for policies and technologies for effective data sharing has also received quite a bit of attention. In a series of editorials, the New England Journal of Medicine (Longo & Drazen, N Engl J Med 2016; 374:276-277. 1/21/2016. DOI: 10.1056/NEJMe1516564 and Drazen, N Engl J Med 2016; 374:e24. 5/12/2016. DOI: 10.1056/NEJMe1601087) discussed the particular challenges for data sharing in the context of clinical data, generating much discussion about the proper approaches for these activities. Most notable, however, was the introduction of the phrase “research parasite” to describe “people who had nothing to do with the design and execution of the study but use another group’s data for their own ends, possibly stealing from the research productivity planned by the data gatherers, or even use the data to try to disprove what the original investigators had posited.” Of course, this perfectly describes (although in somewhat more negative terms than are typically used by data scientists) the motivation behind data sharing in genomics and molecular biology—and the potential value of secondary analysis of public data sets, including the occasional disproof of an incorrect scientific finding or conclusion—thus saving time, resources and potentially lives. The depiction of secondary analyses and the potential refutation of primary analyses as a negative surprised many, but points to the special challenges of sharing sensitive clinical data. Nonetheless, “I am a research parasite” became a refrain among biomedical data analysts who felt strongly that these analyses are indeed quite positive and exactly what is needed. In that vein, the PSB organizers were approached with an idea to host an award to recognize those who have made substantial scientific contributions by analyzing data collected by others. These “Research Parasite Awards” quickly attracted financial support and will be presented for the first time at this meeting. To his credit, Dr. Jeffrey Drazen, the Editor-in-Chief of the New England Journal of Medicine, has also agreed to give a talk about the challenges in clinical data sharing, particularly from his vantage point as an editor of an influential clinical journal. Dr. Drazen has no connection with the Research Parasite Awards, but is fully aware that they have been created and will be awarded at the meeting this year.

The mission of PSB is to provide a forum for the best emerging science in Biocomputing, providing both formal and informal mechanisms for scientific communication. PSB depends on the community to define emerging areas in biomedical computation. Its sessions are usually 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 new dimensions of precision medicine, ranging from single cell measurements to populations.

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 published more than 800 papers. These papers are often cited in journal articles and represent early contributions in emerging 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 2017 is @PacSymBiocomp and the hashtag this year will be #psb17.

The efforts of a dedicated group of session organizers have produced an outstanding program. The sessions of PSB 2017 and their hard-working organizers are as follows:

**Computational approaches to understanding the evolution of molecular function**
Yana Bromberg, Matthew Hahn, and Predrag Radivojac

**Imaging Genomics**
Li Shen and Lee Cooper

**Methods to Ensure the Reproducibility of Biomedical Research**
Patterns in Biomedical Data - How do we find them?
Anurag Verma, Anna Okula Basile, Marta Byrská-Bishop, Christian Darabos, H. Lester Kirchner, and Sarah Pendergrass

Precision medicine: from genotypes and molecular phenotypes towards improved health and therapies
Bruce Aronow, Steven E. Brenner, Dana C. Crawford, Joshua C. Denny, Sean D. Mooney, and Alexander A. Morgan

Single-cell analysis and modelling of cell population heterogeneity
Nikolay Samusik, Sean Bendall, and Nima Aghaepour

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:

Harnessing Big Data for Precision Medicine: Infrastructures and Applications
Kun-Hsing Yu, Steven Hart, Rachel Goldfeder, Qiangfeng Cliff Zhang, Stephen Parker, and Michael Snyder

The Making of Next Generation Data Scientists in Biomedicine
Lana Garmire, Shamim Nemati, John D. Van Horn, Jason Moore, Carole Shreffler and Michelle Dunn

No-Boundary Thinking in Bioinformatics
Xiuzhen Huang and Jason H. Moore

Open Data for Discovery Science
Philip R.O. Payne, Kun Huang, Nigam H. Shah, and Jessica Tenenbaum

We thank our keynote speakers Neil Risch (Science keynote) and David Magnus (Ethical, Legal and Social Implications keynote). We also thank Jeffrey Drazen for his talk.

Tiffany Murray has managed the peer review process and assembly of the proceedings since 2003, and also plays a key role in many other aspects of the meeting. We are grateful for the support of the The Penn Institute for Biomedical Informatics; Rxight Pharmacogenetics Program; and the Institute for Computational Biology, a collaborative effort of Case Western Reserve University, the Cleveland Clinic Foundation, and University Hospitals for their support of PSB 2017. We also thank the National Institutes of Health and the International Society for Computational Biology (ISCB) for travel grant support. The research parasite awards benefit from support from: Jeff Stibel, GigaScience (Biomed Central), Nature Genetics, Scientific Data (Nature), the Gordon & Betty Moore Foundation, the Arnold Foundation, Tim Triche Jr., and Casey Greene.

We are particularly grateful to the onsite PSB staff Al Conde, Ryan Whaley, Georgia Hansen, BJ Morrison-McKay, Cynthia Paulazzo, Jackson Miller, Kasey Miller, and Paul Murray 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.

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

Pacific Symposium on Biocomputing Co-Chairs,
October 15, 2016

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

A. Keith Dunker
Department of Biochemistry and Molecular Biology, Indiana University School of Medicine

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

Marylyn D. Ritchie
Department of Biomedical and Translational Informatics, Geisinger Health System

Teri E. Klein
Department of Genetics, 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.

Nima Aghaeeepour  Shuiwang Ji  Joe Romano
Harindra Arachchi  Kipp Johnson  Mert Sabuncu
Mohammad Arbabshirani  Konrad Karczewski  Satya Sahoo
Bruce Arnon  Jonathan Karr  Erin Simonds
Chloé-Agathe Azencott  Dokyoon Kim  Marina Sirota
Anna Basile  Sungeun Kim  Johannes Soding
Kayhan Batmanghelich  H. Lester Kirchner  Sudeep Srivastava
Chris Bauer  Jun Kong  Jason Stein
Asa Ben-Hur  Linglyong Kong  Timothy Sweeney
Sean Bendall  Mickey Kosloff  Suzanne Tamang
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Mariusz Butkiewicz  Chirag Lakhani  Shaolei Teng
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Kevin Chen  Roman Laskowski  William Thompson
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Yin Hoon Chew  Ruowang Li  Ryan Urbanowicz
Moo Chung  Nita Limdi  Giorgio Valentini
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Christian Darabos  Liang Liu  Fabio Vandin
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Lei Du  Tal Lorberbaum  Anurag Verma
Todd Edwards  Jose Lugo-Martinez  Yogasudha Veturi
Arne Elofsson  Gang Luo  Bjarni Vihjalmssson
Niclas Eriksson  Emily Mallory  Susann Vorberg
Tilman Flock  Elisabetta Manduchi  Pei Wang
Yi Gao  Arjun Manrai  Qianghu Wang
Brice Gaudilliere  Tyler Massaro  Marquitta White
Tian Ge  Brett McKinney  Chunlei Wu
Jeff Gentry  Andrew Michaels  Rong Xu
Olivier Gevaert  Marghoob Mohiyuddin  Ya Yang
Jesse Gillis  Jason Moore  Dmeliha Yetisgen
Anthony Gitter  Yves Moreau  Pooya Zakeri
Rachel Goldfeder  Spencer Muse  Daoqiang Zhang
Casey Greene  Kelly Nudelman  Xiaobo Zhou
Jake Hall  Randy Olson  Chengsheng Zhu
Xiaohe Hao  Casey Overby  Mert Sabuncu
Yun Hao  Bernhard Palsson  Satya Sahoo
Imran Haque  Gaurav Pandey  Erin Simonds
Jaroslav Harezlak  Chirag Patel  Marina Sirota
Blanca Himes  Vikas Pejaver  Johannes Soding
Isaac Hodes  Sarah Pendergrass  Sudeep Srivastava
Emily Holzinger  Hanchuan Peng  Jason Stein
Ting Hu  Minoli Perera  Timothy Sweeney
Junzhou Huang  Abhishek Pratap  Suzanne Tamang
Jake Hughey  Wei-Qi Qei  Haixu Tang
Shaun Jackman  Marylyn Ritchie  Nicholas Tattonetti
Ola Jacunski  Igor Rogozin  Shaolei Teng