

Points for Discussion

Adam R. Ferguson, Ph.D.

Professor, Department of Neurological Surgery
Director of Data Science, Brain and Spinal Injury Center (BASIC)
Zuckerberg San Francisco General Hospital
Weill Institute for Neurosciences
University of California at San Francisco (UCSF)
Principal Investigator, San Francisco VA Healthcare System

Disclosures

Grants:

US National Institutes of Health (NIH): R01NS088475, R01CA213441, R01AG056770, R01MH116156, R01NS122888 U01NS086090, P30AR066262, UH3NS106899, U19AR076737, U24NS122732

US Veterans Affairs (VA): I01RX002245, I01RX002787, I50BX005878

US Department of Defense (DoD): SC150198, SC150177

US Defense Advanced Research Projects (DARPA): N660012024046

US Department of Energy (DoE): LLNL

Craig H. Neilsen Foundation

Wings for Life Foundation

Data Science Consulting:

Santa Clara Valley Medical Center

Neuronasal Inc.

SpineX Inc.

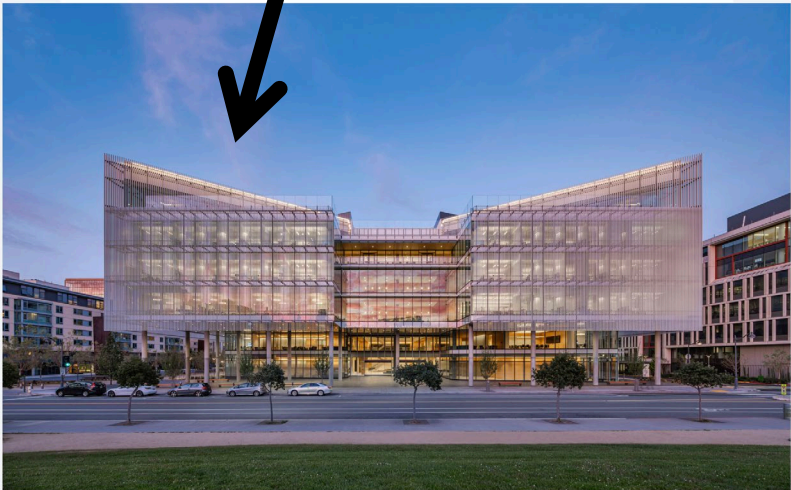
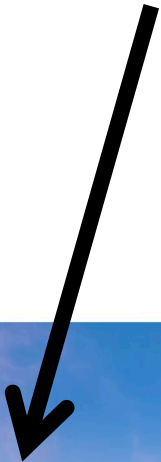
Industry Collaboration (non-financial):

DataRobot: AI for Good program

POINTS FOR DISCUSSION

1. Opinion— individual biomarkers are noisy measures of the full disease space. The cross-correlations among biomarkers provide more precise measures of the *syndromic space* patients are embedded within.
2. Role for *clinical expertise* and Expert Augmented ML (EAML) in clinical validation of multimodal biomarkers.
3. Do multi-model biomarkers require bespoke decision-support tools for clinical implementation?
4. How do we ensure health equity in implementation of these tools?

Weill Neurohub



The UCSF Weill Neurosciences Building, Photo by Tim Griffith

UCSF Weill Institute for
Neurosciences
Brain and Spinal
Injury Center

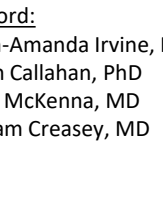
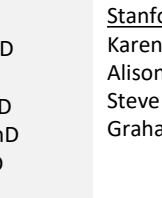
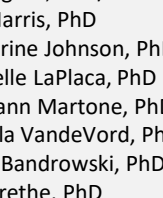
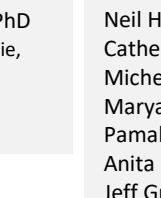
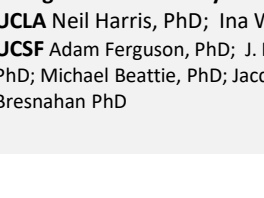
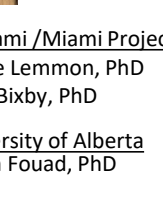
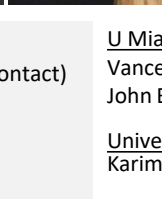
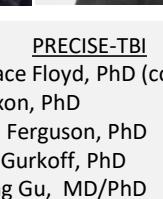
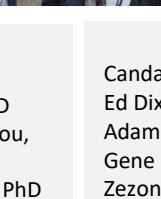
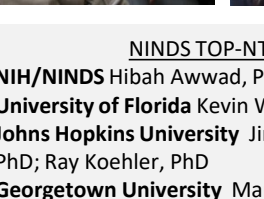
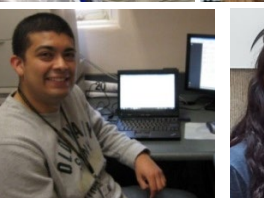
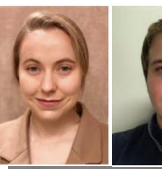
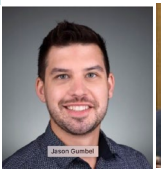
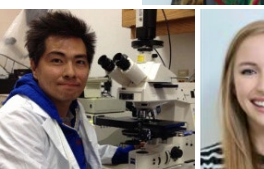
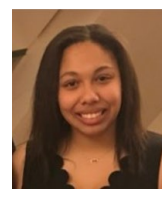
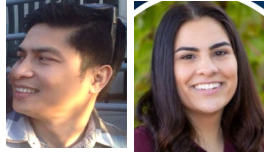


ZUCKERBERG
SAN FRANCISCO GENERAL
Hospital and Trauma Center





University of California
San Francisco



NINDS TOP-NT
NIH/NINDS Hibah Awwad, PhD
University of Florida Kevin Wang, PhD
Johns Hopkins University Jinyuan Zhou, PhD; Ray Koehler, PhD
Georgetown University Mark Burns, PhD
UCLA Neil Harris, PhD; Ina Wanner, PhD
UCSF Adam Ferguson, PhD; J. Russell Huie, PhD; Michael Beattie, PhD; Jacqueline Bresnahan PhD

PRECISE-TBI
 Candace Floyd, PhD (contact)
 Ed Dixon, PhD
 Adam Ferguson, PhD
 Gene Gurkoff, PhD
 Zezong Gu, MD/PhD
 Neil Harris, PhD
 Catherine Johnson, PhD
 Michelle LaPlaca, PhD
 Maryann Martone, PhD
 Pamala VandeVord, PhD
 Anita Bandrowski, PhD
 Jeff Grethe, PhD

U Miami /Miami Project
 Vance Lemmon, PhD
 John Bixby, PhD

University of Alberta
 Karim Fouad, PhD

Stanford:
 Karen-Amanda Irvine, PhD
 Alison Callahan, PhD
 Steve McKenna, MD
 Graham Creasey, MD

FERGUSON LAB:

Carlos Almeida, BS, MS
 Jessica Bath, DPT
 Austin Chou, PhD
 PJ Fairbairn, BS
 Kenneth Fond, BS (MS1)
 Jenny Haefeli, PhD
 J Russell Huie, PhD
 Emma Iorio, BS
 Jason Gumbel, PhD
 Anastasia V Keller, PhD
 Theodore A. Miclau, BS (MS2)
 Kazuhito Morioka, MD, PhD
 Jessica L Nielson, PhD
 Cleopa Omondi, BS, MS (PD2)
 Hannah Radabaugh, PhD
 Ellen Stuck, DPT student
 Dolores Torres, MD
 Christina Tsutsumi, DPT
 Jennifer Truong, DPT

UCSF Beattie/Bresnahan Lab:

Michael S. Beattie, PhD
 Jacqueline C. Bresnahan, PhD
 Tomoo Inoue, MD, PhD
 Amity Lin, BS
 Sang Mi Lee, PhD
 Jerry Sacramento, B.A.
 Ernesto Salegio, PhD

UCSF Manley Lab:

Tomoo Inoue, MD, PhD
 Geoffery T Manley MD, PhD
 Mary Vassar, RN, MS
 John Yue, BA, MS2

UCSF/PT Rehab:

Susanna Rosi, PhD

UCSF Biostatistics:

Mark R Segal, PhD

UCSF Neurology/SFVA:

Ray Swanson, MD
 Steve Massa, MD/PhD
 Raquel Gardner, MD

UCSF/Anesth & Periop Care:

Jonathan Pan, MD/PhD
 Mervyn Maze, MD
 Hua Su, MD

UCSF/Radiology:

Esther Yuh, MD/PhD
 Pratik Mukherjee, MD/PhD
 Jason Talbott, MD/PhD
 Sharmila Majumdar, PhD

UCSF Orthopedics:

Jeff Lotz, PhD
 Chelsey Bahney, PhD
 Ralph Marcucio, PhD

UCSF Psychiatry:

Bruno Biagiatti, MD
 Aoife O'donovan, PhD
 Rachel Loewy, PhD

Collaborators

UCSD:

Mark H. Tuszynski, MD, PhD
 Ephron Rosenzweig, PhD
 John Brock, PhD

UCSD/NIE:

Maryann Martone, PhD
 Jeff Grethe, PhD
 Monique Surles-Zeigler, PhD

UCLA:

Reggie Edgerton, PhD
 Sharon Zdunowski
 Leif Havton, MD, PhD

UC Davis:

Rod Moseanko
 Stephanie Hawbecker

UC Irvine

Os Steward, PhD

University of Kentucky

John C. Gensel, PhD
 Sasha Rabchevsky, PhD

Icahn School Medicine, Mt. Sinai

Fanny Elahi, MD/PhD

University of Zurich

Armin Curt, MD

University of Minnesota

Jessica Nielson, PhD
 Sophia Vinogradov, MD

Texas A&M University

Jim W. Grau, PhD
 Michelle A. Hook, PhD

Ohio State University:

Phillip G. Popovich, PhD
 Dana M. McTigue, PhD
 Jan Schwab, MD, PhD
 Michele Basso, EdD

University of Louisville:

David Magnuson, PhD
 Darlene Burke, MS
 Scott Whittemore, PhD

Swiss Federal Institute of Technology:

Gregoire Courtine, PhD

Funding

US National Institutes of Health (NIH): R01NS088475, R01CA213441, R01AG056770, R01MH116156, R01NS122888; U01NS086090, P30AR066262, UH3NS106899, U19AR076737; U24NS122732

US Veterans Affairs: 1I01RX002245, I01RX002787, I50BX005878

US Department of Defense: SC150198, SC150177

US DARPA

US Department of Energy

Craig H. Neilsen Foundation

Wings for Life Foundation