GABRIEL LOEWINGER

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EDUCATION

Harvard University — Boston, MA
Ph.D., Biostatistics — Expected: May 2022
- National Institutes of Health PhD Fellowship Recipient (NRSA: F31)

Pitzer College — Claremont, CA
B.A., Neuroscience with Honors — May 2012

RESEARCH INTERESTS

- Statistics, Machine Learning, Applied Optimization, Neuroscience, Chemical Dependence

HONORS, FELLOWSHIPS AND GRANTS

- Harvard Medical School Computational Neuroscience Symposium Best Abstract Award — Oct 2020
- National Institutes of Health PhD Fellowship: National Research Service Award (F31) — Aug 2020
- Rose Fellowship, Harvard School of Public Health — Nov 2019
- National Institutes of Health Postbaccalaureate Intramural Research Training Award — Feb 2015
- Fulbright Research Fellowship — May 2013
- Thomas J. Watson Fellowship — May 2012
- Amgen Scholarship (UCLA) — Mar 2011
- Claremont Colleges Summer Neuroscience Research Fellowship — Mar 2011

PUBLICATIONS AND MANUSCRIPTS

Loewinger G, Acosta R, Mazumder R, Parmigiani, G. Optimal Ensemble Construction for Multi-Study Prediction with Applications to COVID-19 Excess Mortality Estimation. *arXiv:2109.09164. Under Review.*

Loewinger G, Patil P, Kishida K, Parmigiani G. Hierarchical Resampling for Bagging in Multi-Study Prediction with Applications to Human Neurochemical Sensing. *bioRxiv:856385. Under review (2nd round).*

Márquez I, **Loewinger G**, Vargas J, López J, Díaz E, Esber G. Surprise-Induced Enhancements in the Associability of Pavlovian Cues Facilitate Learning across Behavior Systems. *bioRxiv:448382. Under Review.*

Rush B, Marcus O, García S, Loizaga-Velder A, **Loewinger G**, Spitalier A, Mendive F (2021). Protocol for Outcome Evaluation of Ayahuasca-Assisted Addiction Treatment: The Case of Takiwasi Center. *Frontiers in Pharmacology, 12.*

Augustin S, **Loewinger G**, O'Neal T, Kravitz A, Lovinger D (2020). Dopamine D2 Receptor Signaling on iMSNs is Required for Initiation and Vigor of Learned Actions. *Neuropsychopharmacology.* 45, 2087–2097.

Johnson K, Voyvodic L, **Loewinger G**, Mateo Y, Lovinger D (2020). Operant Self-Stimulation of Thalamic Terminals in the Dorsomedial Striatum is Constrained by Metabotropic Glutamate Receptor 2. *Neuropsychopharmacology.* 45, 1454–1462.

Loewinger G, Sharma B, Karki D, Khatiwoda P, Kainee S, Poudel K (2016). Low Knowledge and Perceived Hepatitis C Risk Despite High Risk Behaviour among Injection Drug Users in Kathmandu, Nepal. *The International Journal of Drug Policy.* 33:75-82.

Loewinger G*, Oleson E*, Cheer J (2013). Using Dopamine Research to Generate Rational Cannabinoid Drug Policy. *Drug Testing and Analysis.* 5(1):22-26.

Wassum K, Ostlund S, **Loewinger G**, Maidment N (2013). Phasic Mesolimbic Dopamine Release Tracks Reward Seeking During Expression of Pavlovian-to-Instrumental Transfer. *Biological Psychiatry.* 73(8):747-755.

Loewinger G, Beckert M, Tejeda H, Cheer J (2011). Methamphetamine-Induced Dopamine Terminal Deficits in the Nucleus Accumbens are Exacerbated by Reward-Associated Cues and Attenuated by CB1 Receptor Antagonism. *Neuropharmacology*. 62(7):2192-2201.

OPEN-SOURCE SOFTWARE

***studyStrap* | CRAN Package**

- Sole developer of the *studyStrap* R package, freely available on CRAN, which implements numerous machine learning methods for training prediction algorithms with multiple training datasets
- 7,300+ downloads

SELECTED RESEARCH EXPERIENCE

Harvard School of Public Health Boston, MA
Graduate Researcher Aug 2017-Present

- Advisor: Professor Giovanni Parmigiani, Dissertation Committee: Professor Rahul Mazumder (MIT) and Professor Rajarshi Mukherjee (Harvard)
- Developed machine learning methods for integration of multiple datasets to improve prediction performance
- Created domain adaptation ensemble methods for large dataset prediction problems using hierarchical resampling techniques with applications to human neurochemical concentration prediction
- Developed nonlinear optimization-based methods for transfer learning with applications to estimation of COVID-19 excess mortality
- Devised interpretable methods for high dimensional, sparse multi-task regression problems using mixed-integer optimization
- Spearheaded collaborations, served as sole statistician on 3 neuroscience projects and 1 observational clinical study

National Institutes of Health (NIAAA) | Laboratory of Dr. David Lovinger Bethesda, MD
Postbaccalaureate IRTA Research Fellow Feb 2015-July 2017

- Proposed, designed and conducted an experiment to study dopamine activity in decision-making
- Wrote extensive Python code to analyze neurochemical and behavioral data
- Conducted applied statistical analyses (e.g., principal component analysis and linear mixed effects models)

Fulbright Fellowship Kathmandu, Nepal
Research Fellow Aug 2013-Nov 2014

- Designed research methodology and questionnaire for study of HIV risk among drug users
- Secured funding from the United Nations Office on Drugs and Crime
- Hired, trained and led 3 researchers, using Nepali language skills, to conduct over 700 participant interviews
- Conducted extensive statistical analysis of survey response data (e.g., generalized linear models)
- Wrote and submitted final research report to the United Nations Office on Drugs and Crime

Thomas J. Watson Fellowship Peru, Brazil, Thailand, Vietnam
Research Fellow Aug 2012-July 2013

- Conducted qualitative research on alternative treatments for chemical dependence
- Established research contacts in international settings and conducted participant interviews in 3 languages

Colleges Behavioral Health Research Claremont, CA
Researcher Sep 2010-May 2012

- Proposed, designed and led a study on alcohol policy and student drinking behavior
- Secured funding from Dean of Students offices at Pitzer and Harvey Mudd Colleges
- Collected ~500 surveys and analyzed results with structural equation modeling
- Research resulted in policy changes at Pitzer college through addition of a Good Samaritan clause

UCLA, Semel Institute | Laboratory of Dr. Nigel Maidment Los Angeles, CA
Summer Amgen Research Fellow May 2011-Aug 2011

- Ran behavioral and in vivo fast-scan cyclic voltammetry experiments
- Conducted extensive neurochemical and behavioral data analysis with structural equation modeling

University of Maryland, School of Medicine | Laboratory of Dr. Joe Cheer Baltimore, MD
Researcher Aug 2009-Jan 2010

- Proposed, designed and conducted a study assessing methamphetamine neurotoxicity in rats
- Conducted extensive applied statistical analysis of neurochemical and behavioral data (e.g., linear mixed effects models)

University of Maryland, School of Medicine | Laboratory of Dr. Geoffery Schoenbaum Baltimore, MD
Research Assistant May 2009-Aug 2009

- Assisted with behavioral pharmacology experiments in rats

TEACHING

Harvard School of Public Health Boston, MA
Graduate Teaching Assistant May 2018-Present

- **Introductory Statistics for Medical Research**
  - One of 7 teaching assistants for a master's level biostatistics course of ~160 students. Taught sessions on R programming and graded exams
- **Statistics for Medical Research II**
  - One of 5 teaching assistants for a master's level biostatistics course of ~110 students. Taught sessions on R programming and graded homework
- **Practice and Culminating Experience for Quantitative Methods**
  - The only teaching assistant for a master's level biostatistics course of ~35 students. Advised students on statistical components of their capstone research project
- **Consulting Seminar**
  - The only teaching assistant for a doctoral level biostatistics course of ~5 students. Graded homework
- **Applied Regression Analysis**
  - One of 3 teaching assistants for a master's level biostatistics course of ~60 students. Taught weekly section of ~20 students, held weekly office hours and graded homework and exams

RESEARCH TALKS

Applied Statistics Talk: ***Extracting Latent Neural Time Series Signals: Phasic and Tonic Components of Fiber Photometry Data***
Graduate Student Seminar Series, Harvard Biostatistics Apr 2021

Doctoral Thesis Research: ***Machine Learning Methods for In Vivo Neurochemical Estimation***
Read Montague Lab, Virginia Tech **|** *Invited Talk* May 2019
Summer Student Research Symposium, Harvard Biostatistics Aug 2018

NIH IRTA Fellowship Research: ***Accumbal dopamine transients are valence-dependent***
David Lovinger Lab Meeting Presentation May 2016, 2017

Fulbright Pre-Departure Orientation: ***Conducting Research in South Asia***
Fulbight Conference, Washington, DC **|** *Invited Talk* Jun 2015

Fulbright Research: ***The Association Between Drug Rehabilitation Attendance and Hepatitis C Risk Behavior***
Martin Chautari, Social Science Center, Kathmandu, Nepal Sep 2014
Fulbright Commission, Kathmandu, Nepal Aug 2014
South and Central Asia Fulbright Research Conference, Chennai, India Feb 2014

Watson Research: ***Alternative Treatments for Chemical Dependence***
Returning Fellows' Conference, Amherst, MA Aug 2013

Undergraduate Thesis Research: ***Phasic Mesolimbic Dopamine Release is Associated with Pavlovian Cue-Induced Potentiation of Instrumental Activity***
Keck Science Center, Claremont, CA Sep 2011

POSTERS

Loewinger G, Patil P, Mazumder R, Kishida K, Parmigiani G. Multi-Study Machine Learning Methods for In Vivo Estimation of Dopamine in Humans (2020). *Brigham Health/Harvard Medical School Computational Data Neuroscience Symposium*.

Loewinger G, Esber G, Caprioli D, Mateo Y, Lovinger D (2016). Dopamine at indifference: Accumbal dopamine transients are valence-dependent. *Society for Neuroscience Meeting*.

Loewinger G, Wassum K, Ostlund S, Maidment N (2011). Mesolimbic Dopamine Release is Associated With Pavlovian Cue-Induced Stimulation of Instrumental Activity. *Keck Science Center Thesis Poster Session*.

Loewinger G, Wassum K, Ostlund S, Maidment N (2011). Mesolimbic Dopamine Release is Associated With Pavlovian Cue-Induced Stimulation of Instrumental Activity. *Amgen Scholars Poster Session*.

Wassum K, Ostlund S, **Loewinger G**, Maidment N (2011). Phasic dopamine signaling during Pavlovian to instrumental transfer. *Society for Neuroscience Meeting*.

Beckert M, **Loewinger G**, Tejeda H, Bernstein D, Cheer J (2010). Endocannabinoid modulation of methamphetamine neurotoxicity. *Society for Neuroscience Meeting*.

LEADERSHIP AND ACADEMIC SERVICE

Harvard Biostatistics Entering Student Mentor May 2021-Present
- Mentored entering doctoral student

Harvard Biostatistics Multi-Study Learning Journal Club Jan 2021-Present
- Established weekly journal club focused on transfer learning, domain generalization and domain adaptation

Harvard Biostatistics HIV Working Group Co-Organizer Sep 2019-May 2020
- Organized weekly working group seminar series: selected and invited speakers

Pitzer College Neuroscience Club Cofounder Sep 2011-May 2012
- Secured club funding advised new students on the neuroscience major

SKILLS

- **Relevant Software and Computing:** *R*, *Python*, *Julia*, *LaTex*, High Performance Computing Cluster (*Bash*)
- **Applied Statistics:** Cross-Sectional, Multivariate/Longitudinal, Time Series, Survival, Data Visualization
- **Optimization:** Linear, Non-Linear, and Mixed-Inter Optimization with *Julia JuMP*, *Gurobi*, *MOSEK*, *CVXR*
- **Languages:** Nepali (advanced), Spanish (intermediate), Portuguese (intermediate)
- **Interests:** Brazilian Jiu Jitsu, Chess, Vipassana Meditation

RELEVANT COURSEWORK

Harvard University and MIT
- Statistical Methods I-II, Statistical Inference, Probability, Advanced Regression and Statistical Learning, Machine Learning, Analysis of Multivariate and Longitudinal Data, Bayesian Methodology, Dimension Reduction, Introduction to Epidemiology, Social and Biological Networks, Machine Learning through a Modern Optimization Lens, Advanced Optimization, Nonlinear Optimization

PROFESSIONAL REFERENCES

Giovanni Parmigiani, Professor
Department of Biostatistics, Harvard School of Public Health
gp@jimmy.harvard.edu

Rahul Mazumder, Professor
Operations Research and Statistics, Massachusetts Institute of Technology
rahulmaz@mit.edu