GABRIEL LOEWINGER

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EDUCATION

Harvard University | Expected Graduation: May 2022
PhD, Biostatistics.
NIH Graduate Fellowship Recipient (F31/NRSA)

Pitzer College | May 2012
Bachelor of Arts, Neuroscience. Honors. GPA 3.9/4.0

RESEARCH EXPERIENCE

May 2018-Present **PhD Research | Harvard School of Public Health**

- *Thesis Research*: Conducted methodological research in statistics and machine learning. Developed domain generalization and multi-source domain adaptation methodologies leveraging tools from mixed integer and convex optimization. Research involved proposing/deriving new estimators, analytical (proof-based) characterization of properties of estimators and creating packages in R for open-source use of methods
- Developed *studyStrap* CRAN package: ~7000 downloads
- *Collaborative/Applied Statistics:* Planned and conducted statistical analyses as part of independently established collaborations. Applied statistical work involved cross-sectional (e.g., generalized linear models), longitudinal (e.g., generalized estimating equations, generalized linear mixed models), survival and time series (e.g., Gaussian processes) analyses. Co-authored publications in public health and biology journals.
- Advised by Drs. Giovanni Parmigiani (primary), Rahul Mazumder (MIT) and Rajarshi Mukherjee

Feb 2015-June 2017 **Laboratory of Dr. David Lovinger | National Institute on Alcohol Abuse and Alcoholism, National Institutes of Health**

- Proposed, designed and conducted neuroscience experiments to probe dopamine neurotransmission in decision making
- Wrote Python code to analyze data, conducted chemometric analyses (e.g., principal component regression) and applied inference methods (e.g., generalized linear models and generalized linear mixed effects models) for data analysis
- Performed stereotaxic surgery, in vivo optogenetics, fast-scan cyclic voltammetry, behavioral experiments and immunohistochemistry

Aug 2013-Oct 2014 **Fulbright Fellowship Research**

The Association Between Drug Rehabilitation Attendance and Hepatitis C Risk Behavior

- Ran a study to assess whether rehabilitation attendance is associated with lower hepatitis C risk behavior among injection drug users in Nepal
- Designed research methodology and questionnaire, secured ethical approval from Nepal Health Research Council
- Applied for and received additional funding from the United Nations Office on Drugs and Crime, Kathmandu office (Grant#: CO/INST/2013/018)
- Hired and led a team of three Nepali researchers to conduct over 700 interviews with participants
- Analyzed survey data with generalized linear models and linear mixed effects models

Aug 2012-Aug 2013 **Watson Fellowship Research**
International Treatments for Chemical Dependence
- Independently conducted qualitative research on treatments for chemical dependence in Peru, Brazil, Thailand and Vietnam

Sep 2010-May 2012 **Claremont Colleges Alcohol Policy Study**
- Independently proposed, designed and conducted a cross-sectional, survey-based study assessing the association between the alcohol policies of the Claremont Colleges and student drinking behavior
- Secured funding from the Dean of Students offices at Pitzer and Harvey Mudd colleges
- Collected data from over 500 participants
- Analyzed preexisting Claremont Colleges health data (National College Health Association) with structural equation modeling, generalized linear models and linear mixed effects
- Compiled a report for the Dean of Students to create evidence-based policies
- Added a Good Samaritan clause to the Pitzer College alcohol policy

May 2011-Aug 2011 **Laboratory of Dr. Nigel Maidment, Semel Institute | UCLA**
- Measured dopamine release during a behavioral model of craving (Pavlovian-to-Instrumental Transfer)
- Ran behavioral and fast-scan cyclic voltammetry experiments
- Analyzed neurochemical and behavioral data with structural equation modeling

Aug 2009-Jan 2010 **Laboratory of Dr. Joseph Cheer, Department of Anatomy and Neurobiology | University of Maryland, School of Medicine**
- Conducted a study of my own design assessing methamphetamine-induced dopaminergic deficits
- Wrote code for behavioral experiments
- Collected neurochemical measurements
- Analyzed neurochemical and behavioral data

May 2009-Aug 2009 **Laboratory of Dr. Geoffery Schoenbaum, Department of Anatomy and Neurobiology | University of Maryland, School of Medicine**
- Ran behavioral experiments and with pharmacology experiments

May 2008-Aug 2008 **Laboratory of Dr. Nathan Fox, Department of Human Development and Quantitative Methodology | University of Maryland, College Park**
- Research Assistant for surveys and EEG experiments

HONORS AND ACHIEVEMENTS

Oct 2020 Harvard Medical School Computational Data Neuroscience Symposium Best Abstract Award
Aug 2020 NIH National Research Service Award Fellowship (F31)
Nov 2019 Rose Fellowship, Harvard School of Public Health
Feb 2015 NIH Technical Intramural Research Training Award
May 2013 Fulbright Fellowship
May 2012 Watson Fellowship
Sep 2011 Pitzer College Research Travel Award
Mar 2011 Amgen Scholarship
Mar 2011 Claremont Colleges Summer Neuroscience Research Fellowship
Sep 2010 Pitzer College Research Travel Award
May 2007 Pitzer College Trustee Community Merit-Based Scholarship

RESEARCH TALKS

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

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

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

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

Watson Research: ***International Treatments for Chemical Dependence***
Aug 2013 Returning Fellows' Conference, Amherst, MA | *Oral Presentation*

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

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*.

TEACHING

July 2021 **BST 206: Introductory Statistics for Medical Research**

- One of seven teaching assistants for a Master's level biostatistics course of ~160 students. Duties involved teaching sessions on R programming, answering emails and grading exams

Aug 2021 **BST 207: Statistics for Medical Research II**

- One of five teaching assistants for a Master's level biostatistics course of ~110 students. Duties involved teaching sessions on R programming, answering emails and grading homework

Sep 2019-May 2020 **ID 945: Practice and Culminating Experience for Quantitative Methods**

- The only teaching assistant for a Master's level biostatistics course of ~35 students. Duties involved answering emails and meeting with students to help with statistical analysis for their capstone research project

Sep 2019-May 2020 **BST 312: Consulting Seminar**

- The only teaching assistant for a doctoral level biostatistics course of ~5 students. Duties involved answering emails, organizing meetings and grading

Jan 2019-May 2019 **BST 210: Applied Regression Analysis**

- One of three teaching assistants for a Master's level biostatistics course of ~60 students. Duties involved attending class, teaching weekly section of ~20 students, weekly grading of homework, holding weekly office hours, answering emails, meeting with students and grading exams

COMMUNITY AND CAMPUS INVOLVEMENT

Jan 2021-Present **Harvard Biostatistics Multi-Study Learning Journal Club**

- Established weekly journal club focused on domain generalization and domain adaptation
- Presented papers

Sep 2019-May 2020 **Harvard Biostatistics HIV Working Group Co-Organizer**

- Organized weekly working group seminar series: selected, contacted and organized seminar speakers

Sep 2011-May 2012 **Pitzer College Neuroscience Club Cofounder**

- Secured funding to support educational activities
- Advised new students on the neuroscience major
- Led research paper discussions

Sep 2011- May 2012 **Pitzer College Brazilian Jiu Jitsu Club Cofounder**

- Secured funding to provide students of the Claremont Colleges free access to a local academy's Brazilian Jiu Jitsu classes
- Taught weekly classes on campus

Sep 2008-May 2009 **Pitzer College Student Senate**

Student Activities Committee

- Planned events, reviewed funding applications and voted on student government initiatives

COMPUTER SKILLS

Proficient: R
Familiar: Julia, Python, Matlab, SPSS

LANGUAGES

Advanced: Nepali
Intermediate: Spanish, Portuguese

PUBLICATIONS

Loewinger G, Acosta R, Mazumder R, Parmigiani, G. Optimal Ensemble Construction. *In Preparation*.

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*.

Márquez I, **Loewinger G**, Vargas J, López J, Díaz E, Esber G (2021). Surprise-induced enhancements in the associability of Pavlovian cues facilitate learning across behavior systems. *Under Review*.

Loewinger G, Patil P, Kishida K, Parmigiani G (2021). Multi-Study Learning for Real-time Neurochemical Sensing in Humans using the "Study Strap Ensemble". *Under Review*.

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):22-6.

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):747-55.

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):2192-201.