

GABRIEL LOEWINGER

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EDUCATION

Harvard University | Expected Graduation: May 2022

PhD, Biostatistics.

Advisor: Dr. Giovanni Parmigiani

NIH Graduate Fellowship Recipient (F31/NRSA)

Harvard University | May 2019

Master of Arts, Biostatistics.

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. Developed open-source software
- Worked closely with thesis committee members: Rahul Mazumder (MIT) and Rajarshi Mukherjee
- *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

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 researchers to conduct over 700 participant interviews
- Analyzed survey data with generalized linear models and 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

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| 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 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

Languages:

-Proficient: R

-Familiar: Julia, Python, MATLAB

Relevant Software: SPSS, Optimization Solvers (Gurobi, MOSEK)

OPEN-SOURCE SOFTWARE

studyStrap | CRAN Package

I developed the *studyStrap* R package that is freely available on CRAN. The package implements numerous methods for training prediction algorithms with multiple training datasets. ~ 7,000 downloads

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.