

# John C. Flournoy, PhD

Quantitative Research Scientist & Methodological Consultant

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## Professional Summary

Computational research scientist with 12+ years of experience designing rigorous observational and experimental studies, building hierarchical Bayesian models, and building quantitative capacity within multidisciplinary research teams. Deep expertise in longitudinal data analysis, causal inference methods, measurement theory, and research design. Proven ability to serve as methodological consultant and collaborator across diverse research domains—translating complex statistical concepts into practical guidance for researchers with varying quantitative backgrounds. Committed to human-centered, transparent, and reproducible research with youth and vulnerable populations.

## Why This Role: Fit Summary

- ✓ Deep expertise in foundry10's methodological gaps: Causal inference, Bayesian methods, longitudinal analysis, measurement theory, and study design—areas essential for rigorous impact evaluation
- ✓ Proven mentoring and capacity building: 12+ years building quantitative skills within multidisciplinary teams; demonstrated ability to teach rigorous methods to collaborators across varying statistical backgrounds
- ✓ Youth-centered research background: Extensive experience designing and evaluating research with adolescents and vulnerable populations; deep knowledge of ethical considerations, measurement validity, and implementation with youth
- ✓ Bridge between rigor and community responsiveness: Expertise in causal inference and Bayesian methods without dismissing qualitative approaches; see quantitative rigor as complementing—not replacing—community-engaged research
- ✓ Flexible, domain-agnostic consultant: Rapid ability to learn new content areas (neuroimaging → software development → digital health) while maintaining methodological rigor; can support research across foundry10's diverse labs and interest areas
- ✓ Open science commitment: Active contributor to reproducible workflows, transparent reporting, and open-source methodological tools for the research community

## Core Technical Expertise

### Advanced Statistical & Causal Methods

Multilevel/hierarchical linear modeling · Longitudinal data analysis (mixed effects, latent growth curves, intensive designs) · Bayesian inference & modeling (Stan, brms, hierarchical models, prior specification, posterior diagnostics) · Causal inference (DAGs, confounding adjustment, sensitivity analysis, instrumental variables) · Structural equation modeling · Measurement theory & psychometrics (IRT, factor analysis, measurement invariance, reliability)

### Study Design & Methodology

Experimental design & power analysis · Observational study design (matching, weighting, stratification) · Mixed-methods integration · Research protocols & pre-registration · Human subjects research with youth and vulnerable populations · Missing data methods (MCAR/MNAR, multiple imputation)

### Computational & Reproducibility Skills

R (data.table, ggplot2, brms, Stan) · Python · SQL · Git/GitHub · R Markdown & Quarto · Open science practices (OSF, pre-registration, transparent reporting)

# Professional Experience

## Research and Data Science Consultant, Independent

2018–Present

- Provide expert statistical consultation to academic research teams and organizations on study design, causal inference approaches, measurement validation, and Bayesian modeling
- Clients include Harvard neuroimaging labs, digital mental health platforms (Meru Health), and academic teams across psychology and education
- Design observational longitudinal studies with attention to data collection strategies, missing data approaches, and hierarchical model specification
- Validate and develop measurement instruments through item analysis, internal consistency evaluation, and structural validity testing (SEM, IRT)
- Maintain active self-directed learning and experimental projects across statistical, computational, and visualization domains: Bayesian modeling, ML pipelines, visualization tools, and generative AI experiments (see [johnflournoy.science/projects](http://johnflournoy.science/projects))

## Principal Research Scientist, Developer Success Lab, Pluralsight

2024–2025

- Led statistical analysis of longitudinal software development data from 11,000+ developers across 216 organizations (55,000+ observations)
- Specified multilevel models to disentangle individual- vs. organizational-level predictors of cycle time
- Synthesized qualitative insights and quantitative evidence to inform organizational learning and strategy
- Published peer-reviewed work demonstrating that individual-focused interventions have limited impact on system-level outcomes

## Research Associate & Postdoctoral Fellow, Harvard University

2018–2024

- **Longitudinal Neuroimaging & Reliability:** Lead analyst on intensive longitudinal fMRI study (50+ adolescents, 200+ sessions) examining stress and psychopathology mechanisms; developed and evaluated multilevel models of neural activation reliability
- **Intensive Longitudinal Data & Measurement Development:** Designed digital phenotyping protocol (stress, sleep, digital communication, physical activity over 3+ years); validated new self-report and behavioral task measures for adolescent populations, leading to 3 publications (NIMH R37-MH119194, \$9M)
- **Multi-Site Longitudinal Analyses:** Analyzed fMRI data from 500+ adolescents across 4 sites on cognitive control and reward (NIMH U01-MH109589, \$17.1M); conducted systematic, pre-registered measurement invariance testing
- **Methodological Mentoring:** Provided research design consultation and statistical guidance to 8 graduate students, 15 postbaccalaureate RAs, and 9 postdoctoral fellows across 2 lab groups

## Graduate Research Fellow, University of Oregon

2012–2018

- Developed hierarchical Bayesian reinforcement learning model examining adolescent social motives as causes of health-risking behavior
- Collected and analyzed data from 300+ participants, including foster-care-involved adolescents
- Conducted multilevel modeling and SEM of longitudinal personality and fMRI task data
- Validated new behavioral task and self-report measures

## Research Coordinator, Stanford University

2009–2012

- Coordinated Simons Foundation-funded study examining sleep problems and autism spectrum disorder symptoms
- Site coordinator for registered clinical trial evaluating novel PET biomarker of cerebral amyloid in dementia patients

# Publications & Scientific Dissemination

See [Google Scholar](#) for full list of 25+ peer-reviewed articles

## First/Lead Author

Flournoy, J. C., Lee, C. S., Wu, M., & Hicks, C. M. (2025). No Silver Bullets: Why Understanding Software Cycle Time is Messy, Not Magic. *arXiv:2503.05040*. (Under review, *Empirical Software Engineering*)

Flournoy, J. C., Bryce, N. V., Dennison, M. J., et al. (2024). A precision neuroscience approach to estimating reliability of neural responses during emotion processing: Implications for task-fMRI. *NeuroImage*, 285, 120503.

Flournoy, J. C., Vijayakumar, N., Cheng, T. W., et al. (2020). Improving practices and inferences in developmental cognitive neuroscience. *Developmental Cognitive Neuroscience*, 100807.

## Collaborative Publications

Bryce, N., Flournoy, J.C., Moreira, J.F.G., et al. (2021). Brain parcellation selection: An overlooked decision point with meaningful effects on individual differences in resting-state functional connectivity. *NeuroImage*, 118487.

Ludwig, R. M., Flournoy, J. C., & Berkman, E. T. (2019). Inequality in personality and temporal discounting across socioeconomic status? Assessing the evidence. *Journal of Research in Personality*, 81, 79–87.

Matta, T. H., Flournoy, J. C., & Byrne, M. L. (2018). Making an unknown unknown a known unknown: Missing data in longitudinal neuroimaging studies. *Developmental Cognitive Neuroscience*, 33, 83–98.

# Teaching, Mentoring & Capacity Building

## Workshops & Training

- ABDC Workshop Instructor (2021): *Modeling Developmental Change*—Data science tools, SEM theory and hands-on tutorial
- UC Adolescence Consortium Presenter (2021): *Why and How to Care About Covariates in Longitudinal Data*
- Lifespan Informatics & Neuroimaging Center, UPenn Seminar (2021): *Scientific Practice in Developmental Cognitive Neuroscience*
- Institute for Technology in Psychiatry, McLean Hospital (2019): *Machine Learning as a Tool for Diagnosis and Theory Testing*

## Mentorship

- Provided methodological consultation, study design guidance, and statistical training to 32+ researchers (graduate students, postbac RAs, postdocs) across 2 major research groups
- Mentored development of research proposals, analysis plans, and manuscript preparation
- Trained research staff in human subjects ethics, IRB protocols, data quality assurance, and open science practices

## Media & Public Communication

- Guest, The Stack Overflow Podcast (2025)
- Production Assistant, American Masters (PBS, 2005)

# Open Science & Methodological Infrastructure

## R Packages (CRAN & GitHub)

- **riclpmr**: Generate syntax for random intercept cross-lagged panel models—enables researchers to implement complex longitudinal designs with accessible interfaces
- **curvish (alpha)**: Bayesian analysis and visualization of GAM smooths using 1st and 2nd derivatives—supports flexible nonparametric estimation with Bayesian uncertainty quantification
- **scorequaltrics**: Retrieve and score data from Qualtrics using CSV templates—streamlines survey data workflow and reproducibility

## Open Data & Reproducibility

- Contributor to Open Science Framework; publicly shared data and analysis code for multiple studies
- Active practitioner of pre-registration, open science practices, and transparent statistical reporting

# Education & Professional Training

## Ph.D., Psychology, University of Oregon

2018

Focus: Computational methods, Bayesian hierarchical modeling, developmental neuroscience

## M.S., Psychology, University of Oregon

2014

## B.A., Cognitive Science, University of California, Berkeley

2005

## Specialized Training

- Advanced Bayesian Models for the Social Sciences | ICPSR Summer Program in Quantitative Methods, 2015
- Causal Inference for the Social Sciences | ICPSR Summer Program in Quantitative Methods, 2015
- Python Programming and Neuroinformatics | Neurohackweek, 2016

# Academic Appointments

Associate of the Department of Psychology (Courtesy Appointment) | Harvard University, 2024–Present

# Awards & Recognition

- The Sackler Scholar Programme in Psychobiology Research Grant, 2019
- Gary E. Smith Summer Professional Development Award, 2015
- Clarence and Lucille Dunbar Scholarship, 2014