Robert Tromm

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EDUCATION

University of Oxford, Oxford, UK   **March 2023 – September 2023**
MSc Research Studentship, Centre for Eudaimonia and Human Flourishing

Maastricht University, Maastricht, Netherlands   **August 2021 – August 2023 (Expected)**
MSc Cognitive & Clinical Neuroscience
- **Honors:** *Distinction (expected)*
- **Relevant Coursework:** Advanced Statistics, Biomedical Brain Imaging, Electrophysiology, Introduction to R, Neuroanatomy

Brandeis University, Waltham, MA, USA   **August 2016 - May 2020**
BS Neuroscience
- **Honors:** *Cum laude.*
- **Relevant Coursework:** Principles of Neuroscience, Computational Neuroscience, Data Structures & Algorithms, Data Analysis & Statistics, Philosophy of Mind, Neuroethics.

DIS: Danish Institute for Study Abroad, Copenhagen, Denmark   **January 2019 - May 2019**
Study Abroad Program

SKILLS

- **Neuroscience:** Computational neuroscience, neuroimaging preprocessing, hypothesis testing, literature review, experimental design
- **Computational:** Whole-brain modeling, machine learning, clustering algorithms, data science, statistical analysis, high-dimensional data analysis, Bayesian modeling & optimization, algorithms
- **Tools and Frameworks:** MATLAB, Python (scipy, numpy, nilearn, scikit-learn), Tensorflow, PyTorch, neuroimaging (FSL, SPM, FreeSurfer), R, SPSS, Bash, C++
- **Project Management:** Kanban, Gantt, Notion

HONORS & AWARDS

Usona Institute Scholarship, Usona Institute ($7,500 USD)   2023
Justice Brandeis Scholarship, Brandeis University ($70,000 USD in total)   2016 - 2020
Alumni and Friends Grant, Brandeis University ($8,840 total)   2016 - 2020
AHEPA Scholarship, American Hellenic Educational Progressive Association ($1,750 USD)   2016
Academic and Adversity Scholarship, Southern Alumni Scholarship Foundation ($1,750 USD)   2016

RESEARCH EXPERIENCE

University of Oxford, Oxford, UK   **March 2023 – September 2023**
Visiting Researcher, Centre for Eudaimonia and Human Flourishing
- Collaborated with 8 professors and 2 PhD students from 7 international universities to analyze shifts in brain hierarchy due to chronic psychedelics and cannabis use using signal processing, ML algorithms, information theory, and graph theory.
- Processed 3 multi-modal fMRI datasets, yielding an advanced whole-brain model of irreversibility, effective connectivity, and trophic coherence using functional & diffusion tensor imaging.
- Implemented SVM algorithm with Bayesian hyperparameter optimization and random forest classifier to achieve >90% accuracy in distinguishing drug user groups and detecting hierarchical changes in 80 brain

regions.

Maastricht University, Maastricht, Netherlands   **June 2022 – March 2023**
Research Assistant, <u>Laboratory of Dr. Jan Ramaekers</u>
- Optimized a custom fMRI pre-processing pipeline using Docker, FastICA, MRIcron, and machine learning skull-stripping (HD-BET), improving performance by 50% and saving 2 hours of work time per dataset.
- Implemented binary masks, Butterworth filters, outlier detection, and robust functional connectivity (FC) techniques including PCA.

Imperial College London, London, England   **February 2021 – February 2022**
Research Assistant, Centre for Psychedelic Research
- Transcribed post-psychedelic integration therapy session audio interviews for use in INSIGHT protocol studies under the supervision of Dr. Taylor Lyons.

Brandeis University, Waltham, MA, USA   **June 2019 – May 2020**
Undergraduate Researcher, Laboratory of Prof. Eve Marder
- **Thesis topic:** Variability in homeostatic tuning rules produces diverse correlations in ion channels.
    - **Key finding**: Model neurons express variability in mRNA- and ion channel-level maximal conductance across neurons of the same cell type through differential regulation of ion channel associated mRNA transcription rates.
- Discovered that variation in ion channel receptor-coupled mRNA transcription rate increases robustness of homeostasis through expansion from 1 to 2-dimensional solution space.
- Constructed and analyzed 2 models of neuronal homeostasis in MATLAB and C++ with *Xolotl*.
- Implemented 2 homeostatic control mechanisms, derived from control theory and nonlinear dynamics, for use with *Xolotl*, improving performance by 3x versus the gold-standard simulator, NEURON.

PROFESSIONAL EXPERIENCE

Intercollegiate Psychedelics Network   **August 2020 – September 2021**
Research & Professional Development Coordinator
- Worked on developing a mentorship pipeline for early-career students interested in psychedelic studies, entrepreneurship, and activism in the growing psychedelic space.
- Organized PsychedelX, a multidisciplinary seminar series for students interested in developing public speaking and presentation skills by giving seminars on psychedelic studies topics.

Novamind, Toronto, ON Canada   **November 2020 – March 2021**
Statistician & Research Assistant, Laboratory of Dr. Adele Lafrance
- Collaborated with 3 neuroscientists and psychologists across industry and academia to advise on analytical methods for studying ketamine's role in treating eating disorders (ED).
- Assessed significant decreases in reliable change index (RCI) for 6 psychological measures (STAI, DERS-16, FAD-GFS, SCS, RSES, MADRS) post ketamine administration at 1-month follow-up.

Psygaia   **November 2020 – May 2021**
Co-founder
- Startup focused on building intermediary schooling & educational resources for therapists intending to attain certificates in psychedelic psychotherapy.
- Led successful application into Tabula Rasa Ventures incubator (2021 cohort) to accelerate the incorporation of the company and development of the business & organizational model, revenue streams, and legal team.
- Began partnership with Sage Institute, a sliding-scale psychotherapy clinic based in Oakland, CA, and the San Francisco Psychedelic Society.

PRESENTATIONS

SciFest IX Summer Symposium, Waltham, MA, USA   **August 2019**
Dual homeostatic mechanisms can reproduce diverse ion channel correlations
- Presented a novel homeostatic pairing mechanism that effectively reproduced robust and diverse correlations between ion channels in model neurons.

PROJECTS

PsychedelX   **August 2020 – February 2020**
Student-based talk competition for psychedelic studies and science *(link)*
- In 2020, 30 undergraduate and graduate students were accepted into the competition. Judges for the final round of the competition included researchers Manoj Doss, Robin Carhart-Harris, Taylor Lyons, Eesmyal Santos-Braut, and Thomas Roberts.
- Led workshops on public speaking, presentation creation, research methods, and best practices for getting into both grad school and the psychedelic industry.
- Organized and moderated an industry Q&A panel for students interested in working in the psychedelic industry. Panelists, including Ronan Levy, Eesmyal Santos-Braut, and Marik Hazan, discussed best practices for getting into the industry and personal experiences with their respective companies.

WORKSHOPS & CERTIFICATIONS

Neuromatch   **July 2020**
Neuromatch Academy Summer School for Computational Neuroscience
- Month-long summer intensive providing training in methods in computational neuroscience.