Fatma Uyar Morency

PhD, Research Scientist

Carnegie Mellon University

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github
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Career goal

My goal is to make an impact through my expertise in data science. Much of that analytical expertise has been gained through large biomedical data analysis and I am eager to branch out into new verticals.

Education

2006 - 2013 **Carnegie Mellon University** Pittsburgh, PA
M.S., Ph.D. in Materials Science and Engineering

2002 - 2006 **Sabanci University** Istanbul, Turkey
B.S. in Materials Science and Engineering
*Ranked **27th** among **1,489,351** in the National University Entrance Exam (ÖSS)*

Experience

2016 - Present **Research Scientist**, Carnegie Mellon University
UTILIZING MACHINE LEARNING FOR BRAIN FUNCTIONAL CONNECTIVITY ANALYSIS

- Created Predictive flow algorithm: discovers the relationship between brain regions based on their temporal sequences of activation using machine learning. [Github]
- Analyzed one of the largest datasets for brain neuroimaging: 800+ participants, 220 temporal scans, 200K data point per scan (~ 1 TB)
- Techniques: Matlab, Python, R, Jupyter, L1 regularized regression (LASSO)

2014 - 2016 **Post-doctoral Researcher**, University of Pittsburgh
BRAIN MECHANISMS BEHIND PHYSICAL ACTIVITY AND IMPROVED NEUROCOGNITIVE FUNCTION

- Created multi-threaded parallel pipeline to analyze brain MRI images across multiple datasets (weight loss, Parkinson's, childhood obesity); speeding up processing by 800%.
- Applied statistical mediation analysis to uncover causal links between fitness, aspects of brain health and cognitive function.
- Trained graduate and undergraduate students and served on a thesis honors committee.

DECODING BRAIN PATTERNS FOR PREDICTING HEART DISEASE RISK MARKERS

- Delivered brain phenotype for peripheral blood pressure reactivity. [Github]
- Developed PCA-LASSO toolbox to predict cardiovascular risk based on brain activity.
- Co-authored top-tier journal article which received media coverage. [Reuters]
- Techniques: Matlab, FSL, Freesurfer, gnu parallel, SPSS, mediation, PCA, LASSO

2014-2015 **Course Instructor**, Center for Neural Basis of Cognition

- Developed 6-weeks course to train graduate students, postdocs and faculty (US and international fellows) in advanced brain imaging techniques and machine learning for fMRI.

2011-2013 **Post-doctoral Researcher**, George Washington University
INVESTIGATING ROLE OF ATTENTIONAL MODULATION ON BRAIN SENSORY SIGNALS

- Executed a complete human subject study:
  (1) designing experimental protocol including visual psychological tasks,
  (2) recruiting stroke patients with visual attention deficits and healthy control subjects
  (3) classifying brain activity using various multivariate pattern classifiers (i.e. SVM)
  (4) statistical testing of research hypotheses using SPSS (ANOVA)
- Techniques: Psychtoolbox, Python, libSVM, BrainVoyager, medical record review, SPSS

Skills

Programming MATLAB, C++, FORTRAN, Python, SPSS, R, Bash scripting, Jupyter notebook
Analysis Machine Learning, Neural Network, Finite Element, fMRI, statistics

Honors and Awards

2010 The Minerals, Metals and Materials Society Meeting 3rd Place Poster Award
2010 University of Ottawa Computational Neuroscience Summer School Fellowship
2002-2006 Sabanci University High Honor Full Tuition Scholarship
2002 Isbank Golden Youth Award
2002 Turkish National Education Ministry fellowship to pursue BS/BA abroad

Publications

2018 **Predictive Flow Model of Resting-State Functional Network and Structural Constraint Analysis,** Fatma Uyar Morency, Javier O. Garcia, Jean M. Vettel, and Timothy Verstynen *[in prep.]*

2018 **Associations Between Cardiorespiratory Fitness, Physical Activity, Intraindividual Variability and Cingulate Cortex in Younger Adults,** Joao Bento-Torres, Chelsea M. Stillman, George A. Grove Jr., Haiqing Huang, Fatma Uyar, Jennifer C. Watt, Marigold E. Wollam, Kirk I. Erickson *[in prep.]*

2018 **Cardiorespiratory Fitness Is Associated With Enhanced Hippocampal Functional Connectivity In Healthy Young Adults,** Chelsea M. Stillman, Fatma Uyar, Haiqing Huang, George A. Grove Jr., Jennifer C. Watt, Mariegold E. Wollam and Kirk I. Erickson. ***Hippocampus***

2017 **A Brain Phenotype For Stressor-Evoked Blood Pressure Reactivity,** Peter J. Gianaros, Lei K. Sheu, Fatma Uyar, Jayanth Koushik, J. Richard Jennings, Tor D. Wager, Aarti Singh, Timothy D. Verstynen. ***Journal of American Heart Association***

2016 **Retinotopic Information Interacts With Category Selectivity In Human Ventral Cortex** Fatma Uyar, Sarah Shomstein, Adam S. Greenberg, Marlene Behrmann. ***Neuropsychologia***

2016 **Physical Activity Is Associated with Reduced Implicit Learning but Enhanced Relational Memory and Executive Functioning in Young Adults,** Chelsea M. Stillman, Jennifer C. Watt, George A. Grove Jr., Marigold E. Wollam, Fatma Uyar, Maria Mataro, Neal J. Cohen, Darlene V. Howard, James H. Howard, Kirk I. Erickson. ***PLOS One***

2013 **Sensory Processing with Varying Degrees of Attention: Lessons from Hemispatial Neglect,** Sarah Shomstein, Fatma Uyar, Adam S. Greenberg, Marlene Behrmann. ***Journal of Vision***

2012 **Simulation of Grain Growth under the Effect of Stress,** Fatma Uyar, Seth R. Wilson, Myrjam Winning, Anthony D. Rollett. ***Materials Science Forum***

2009 **Testing a Curvature-Driven Moving Finite Element Grain Growth Model with the Generalized 3-D von Neumann Relation,** Fatma Uyar, Seth R. Wilson, Jason Gruber, Sukbin Lee, Stephen Sintay, Anthony D. Rollett, David J. Srolovitz. ***International Journal of Materials Research***

2008 **Testing the MacPherson-Srolovitz Theory in Simulations of 3-D Grain Growth,** Anthony D. Rollett, Fatma Uyar, Seth R. Wilson, Jason Gruber, Sukbin Lee. ***Bulletin of the American Physical Society***

Presentations

October 2012 **Sensory Processing with Varying Degrees of Attention: Lessons from Hemispatial Neglect**
Poster Presentation, Society for Neuroscience Conference, New Orleans, LA

February 2010 **Tissue Development in Arabidopsis: 3-D Shape Analysis for Automated Detection of Cell Type** Poster Presentation, The Minerals, Metals and Materials Society Meeting, Seattle, WA

October 2009 **Stagnation of Thin Film Grain Growth Under the Effect of Stress**
Invited talk, Materials Science and Technology Conference, Pittsburgh, PA

August 2009 **Stagnation of Thin Film Grain Growth Under the Effect of Stress**
Poster Presentation, Gordon Conference Physical Metallurgy Meeting, Andover, NH

February 2009 **Effect of Stress on Grain Boundary Network**
Oral Presentation, Computational Materials Science Network Meeting, San Francisco, CA

April 2008 **Mean Width and Growth Rates in 3-D Microstructures**
Oral Presentation, Computational Materials Science Network Meeting, Boston, MA

March 2008 **Application of Mean Width to 3-D Materials Science**
Oral Presentation, The Minerals Metals Materials Society Conference, New Orleans, LA

April 2006 **PVP Micellar Nanoreactors for Blue-Luminescent ZnO Quantum Dots**
Poster Presentation, Materials Research Society Conference, San Francisco, CA