Rick Farouni | Curriculum Vitae

Massachusetts General Hospital/Harvard Medical School

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My two main areas of expertise lie in statistical modeling and data science, with a focus on building probabilistic generative models and analyzing large datasets with complex structure. Currently, I am a post-doctoral research fellow in computational biology, working in the lab of Dr. Pinello at the Massachusetts General Hospital/Harvard Medical School. My research projects at the lab involve the application of multivariate statistics, machine learning, and deep learning to epigenomics and CRISPR data. I received a PhD in Quantitative Psychology (statistics applied to modeling psychological and neuroimaging data) and a master's degree in Mathematical Statistics from the Ohio State University.

Experience

Postdoctoral Research Fellow

- **Massachusetts General Hospital/Harvard Medical School** — **MA, USA**
  Research Lab of Professor Luca Pinello, Molecular Pathology Unit — *06/2017*

Research Intern

- **The Department of Biomedical Informatics Summer Internship Program (BMI SIP)**
  Research Lab of Professor Ewy Mathè, The Ohio State University — *2016*

  Project: Developing an R package and a Shiny app for the analysis of data generated from genome-wide chromatin accessibility assays such as ATAC-seq and DNase-seq with the goal of identifying regulatory elements involved in the cancer epigenetic landscape.

University Teaching Assistant

- **The Ohio State University** — **Ohio, USA**
  Graduate Teaching Associate — *2013–2017*

  Served as a Teaching Assistant for three courses: Repeated Measures Models, Covariance Structure Models, and Data Analysis in Psychology.

Independent Tutor

- **Test Preparation Instructor** — **Moscow, Russia**
  Instructor of the Graduate Management Admission Test (GMAT) — *2009-2012*

- **Teacher of English as a Foreign Language** — **Moscow, Russia**
  Teacher of General and Academic English — *2001-2009*

Education

Academic Qualifications

- **The Ohio State University** — **Ohio, USA**
  PhD in Quantitative Psychology — *2015–2017*

  Dissertation Topic: *'Application of Deep Latent Generative Models to the Unsupervised Learning of Chromatin States'*

- **The Ohio State University** — **Ohio, USA**
  Master of Science in Statistics — *2012-2014*

- **The Ohio State University** — **Ohio, USA**
  Master's Degree in Quantitative Psychology — *2012-2014*

  Thesis Project: *'Latent Variable Modeling of Categorical Item Responses in a Hierarchical Bayesian Framework'*

- **The Pennsylvania State University** — **Pennsylvania, USA**
  Bachelor's Degree in Psychology with High Distinction — *2011-2012*

Technical Skill Set

- **Statistics and Machine Learning**
  - ***Scientific Programming Languages:*** Proficient in and comfortable transitioning between *R*, *Python* depending on computing goals. Familiar with *Julia*.
  - ***Deep Learning Frameworks:*** Experienced in using Tensorflow and Keras.
  - ***Probabilistic Programming Languages:*** Proficient in Stan.
- **Bioinformatics and Neuroimaging Software**
  - ***Neuroimaging data analysis:*** Nipype, PyMVPA, FreeSurfer, FSL.
  - ***Next Generation Sequencing (NGS) data analysis:*** R's Bioconductor core packages, Bowtie2, MACS2, and bedtools.
- **Cluster and High-Performance Computing**
  - Good knowledge of running neuroimaging and bioinformatics analysis pipelines on super-computing clusters.
- **Web and Software Development Tools**
  - LaTeX, Linux OS, Git, Docker, and Bash. Basic knowledge in website development tools such as HTML, CSS, and Jekyll.

Conference Presentations

- **Joint Statistical Meetings** — **Seattle**
  Poster Presentation — *2015*

  Poster Title: Across-Subject Predictive Modeling of fMRI BOLD Responses to Faces using a sparse Bayesian Group Factor Analysis Model

Awards and Fellowships

- **Graduate Student Conference Presentation Award**
  The Ohio State University *2015*
- **The Center for Cognitive and Brain Sciences Summer Graduate Fellowship**
  The Ohio State University *2015*

  Project Proposal: *'Decoding the Pixels of the Face Image from the Voxels of fMRI BOLD Activity Patterns'*
- **The Social and Behavioral Sciences Summer Fellowship**
  The Ohio State University *2014*
- **University Fellowship**
  The Ohio State University *2012*

Publications and Software

Journal Papers

- Baskin, E., Farouni, R., and Mathè, E. (2016). ALTRE: workflow for defining ALTered Regulatory Elements using chromatin accessibility data. ***Bioinformatics*** doi: 10.1093/bioinformatics/btw688. Preprint available at `http://www.biorxiv.org/content/early/2016/10/14/080564.full.pdf+html` (first co-author)
- Pinello, L., Farouni, R., and Yuan, G-C. (2017). Haystack: systematic analysis of the variation of epigenetic states and cell-type specific regulatory elements (under review) doi: 10.1101/199067. Preprint available at `https://doi.org/10.1101/199067` (first co-author)

Preprints

- Farouni, R. (2017). A Contemporary Overview of Probabilistic Latent Variable Models. ***arXiv preprint***. Preprint available at `https://arxiv.org/abs/1706.08137`

Dissertation and Thesis

- Farouni, R. (2017). Application of Deep Latent Generative Models to the Unsupervised Learning of Chromatin States. *PhD Dissertation*. Manuscript available at `https://etd.ohiolink.edu/!etd.send_file?accession=osu1492189894812539&disposition=inline`
- Farouni, R. (2014). Latent Variable Models of Categorical Responses in the Bayesian and Frequentist Frameworks. *Masters Thesis*. Manuscript available at `https://etd.ohiolink.edu/!etd.send_file?accession=osu1412374136&disposition=inline`

Software Development

- ALTRE: A Workflow for Identifying ALTered Regulatory Elements using Chromatin Accessibility Data. GitHub Repo: `https://github.com/Mathelab/ALTRE`.
- Haystack: systematic analysis of the variation of epigenetic states and cell-type specific regulatory elements. GitHub Repo: `https://github.com/pinellolab/haystack_bio`.

Journal Review Service

- **Psychometrika**
  Ad Hoc Reviewer *2015*
- **Psychological Methods**
  Ad Hoc Reviewer *2016*

Personal Details

- **Country of Current Residence:** USA
- **Country of Previous Residence:** Russia (12 years)
- **Marital Status:** Married
- **Interests and Hobbies:** Evolutionary Biology, World Cuisines, Experimental Music
- **Languages Spoken:** English, Arabic, Russian, Spanish (intermediate), French (elementary)