Frank Tranghese

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Education

- **Boston University** — Boston, MA
  M.S. in Electrical Engineering; GPA: 3.5 — *Aug. 2016 – May 2018*
  B.A. in Biology and Psychology; GPA: 3.3 — *Aug. 2007 – May 2011*

Experience

- **Boston University - Applied Electromagnetics Lab** — Boston, MA
  Graduate Research Assistant — *Jan. 2017 - June 2018*
  - **Sub-Millivolt Electric Field Sensor**: Developed data acquisition and signal processing pipeline in MATLAB for highly sensitive electric field sensor. Utilized digital filters, spectral density estimation, and periodogram averaging to detect field in SNR less than 0 dB. Designed and coded MATLAB GUI to provide easy to use, rapid testing environment. Aided in refinement of sensor design.
  - **Circuit Design and Testing**: Built, tested, and refined analog filters, three-phase motor drivers, and PID motor controllers for optimizing electric field sensor signal output. Selected appropriate hardware to meet sponsor's needs.

- **Boston University** — Boston, MA
  Related Projects — *Aug. 2016 - May 2018*
  - **Lane Tracking for Autonomous Cars**: Using Python and OpenCV, developed system that tracks unmarked roads with K-means clustering and morphological transformations on optical images. Implemented techniques present in the literature using image intensity for improved robustness to weather and lighting variations.
  - **Video Compression and Transformations**: Developed Java programming pipeline that encoded 100+ images into a playable video in under 5 minutes using chroma sub-sampling and discrete cosine transform. Allowed for optional video transformations (grayscale, Gaussian blur, color inversion) and output video quality selection.
  - **Gender Bias in Word Embeddings**: Investigated and implemented in MATLAB methods found in literature for removing gender bias in word embeddings, a commonly used natural language processing technique. Used pre-trained word2vec on Google News text corpus. Tested methods' ability to remove gender bias from gender-neutral words while maintaining gender-specific semantic meaning.

- **Harvard Medical School** — Boston, MA
  Research Assistant and Lab Manager — *Jun. 2013 - Jun. 2016*
  - **Sengupta Lab**: Profiled metabolic factors associated with GABRA5 signaling in medulloblastoma. Managed all laboratory logistics; including ordering and supply management. Acted as liaison to collaborating scientists. Coordinated with administrative groups to maintain strict laboratory regulations and procedures.
  - **Pomeroy Lab**: Examined stress-mediated alternative protein translation and its role in cancer development. Researched disrupted circadian rhythm and resulting chromatin remodeling in medulloblastoma cells.

Skills

- **Programming Languages**: MATLAB, C++, Java, Python
- **Technologies**: Git, OpenCV, FFMPEG, Data Acquisition Package (MATLAB), DSP Systems Toolbox (MATLAB), Simulink, PSpice/LTSpice, IntelliJ, Standard Testing Equipment(Oscilloscope, Voltmeter, Function generator), Bash Terminal, SSH, MS Office Suite (including Word, Excel, Powerpoint)
- **Technical Skills**: Digital Signal Processing, Analog/Digital Filter Design, Control System Design, Agile Software Development, Stochastic Estimation and Bayesian Inference, Machine Learning, Natural Language Processing, Algorithm design and analysis, Parallel Programming, Biomedical Optics

Publications

- **First in vivo testing of novel compounds targeting Group 3 medulloblastoma using an implantable microdevice as a new paradigm for drug development** Journal of Biomedical Nanotechnology, Jun 2016 (https://doi.org/10.1166/jbn.2016.2262)