Timothy Melano, PhD

EDUCATION

BIOMEDICAL ENGINEERING PROGRAM, UNIVERSITY OF ARIZONA
Doctor of Philosophy, 2011

- Doctoral research on *Insect-Robot Interface* publicity: featured in *Los Angeles Times* (circulation > 700,000) and *New Scientist* (watch Cyborg Insects YouTube video, views > 1.8 million)

UNIVERSITY OF CALIFORNIA AT BERKELEY
Bachelor of Science in Mechanical Engineering, 2001

EXPERIENCE

IBM Research: Brain Inspired Computing Group (San Jose, CA), March 2014 – Present
Research Scientist (Neuromorphic Hardware, Deep Learning, Python, C, C++, Matlab)

- Led a team of Research Staff Members to achieve state of the art performance on GTSRB (a benchmark dataset) using convolutional networks on TrueNorth
- Led and developed the curriculum for the 2016 Bootcamp Reunion which had over 70 attendees from universities and government labs
- Developed, tested and released code to the community of TrueNorth Developers
- Initiated and managed a successful and resourceful online forum for TrueNorth developers
- Developed a real-time (1000 classifications per second) gesture recognition system with TrueNorth and a neuromorphic camera, the Dynamic Vision Sensor from Ini Labs, Zurich
- Currently developing a real-time pedestrian detection system on TrueNorth

BASIS SCIENCE (SAN FRANCISCO, CA), April 2012 – September 2013
Biosignal Algorithms Engineer (Python, Machine Learning)

- High-impact contributor to the launching of the Basis Band, the most advanced health-tracking device that leverages five sensors to help people easily incorporate healthy habits into their daily routines (see Popular Science, CNET)
- Major contributor to the Calories, Activity Classification and Steps metrics displayed on the Basis Band
- Patents filed for a heart rate related metric and an activity classification algorithm
- Manager of the internal biosignals database that uses the NoSQL framework, PyMongo/MongoDB
- Basis Science was bought by Intel for $100M

MAX PLANCK INSTITUTE FOR BIOLOGICAL CYBERNETICS (TUEBINGEN, GERMANY), June 2009 – June 2011
Research Associate

- Technical lead in the group Cholinergic Mechanisms of Learning and Cognition
- Investigated primate brain mechanisms that underlie acetylcholine release using pharmacology, fMRI, electrophysiology, machine learning, and signals processing

UNIVERSITY OF ARIZONA, NEUROMORPHIC ENGINEERING AND ROBOTICS LABORATORY (TUCSON, AZ), August 2002 – May 2009
Research Assistant

- Computationally replicated pharmacological manipulations of a neuronal model in the fly brain that underlie visual motion detection
- Designed, built and successfully tested world's first insect-brain controlled robot; the robot was built from custom designed analog circuits, micro-controllers and computer code in C

PUBLICATIONS

- A Amir, B Taba, D Berg, **T Melano**, J McKinstry, C Di Nolfo, T Nayak, A Andreopoulos, G Garreau, M Mendoza, J Kusnitz, M Debole, S Esser, T Delbruck, M Flickner, D Modha. "A Low Power, Fully Event-Based Gesture Recognition System," (To appear in CVPR 2017)
- R Appuswamy, TK Nayak, JA Arthur, SK Esser, PA Merolla, JL McKinstry, **T Melano**, MD Flickner, DS Modha. "Structured Convolution Matrices for Energy-Efficient Deep Learning," (June 2016) arXiv:1606.02407
- SK Esser, PA Merolla, JV Arthur, AS Cassidy, R Appuswamy, A Andreopoulos, DJ Berg, JL McKinstry**, T Melano**, DR Barch, C di Nolfo, P Datta, A Amir, B Taba, MD Flickner, DS Modha. "Convolutional Networks for Fast, Energy-Efficient Neuromorphic Computing," *PNAS* (2016) 113:41, 11441-11446
- **T Melano**. "Insect-Machine Interfacing." *Doctoral Dissertation*, ARL Division of Biomedical Engineering, University of Arizona, Tucson, AZ, 2011.
- **T Melano**, CH Higgins. "The neuronal basis of direction selectivity in lobula plate tangential cells." *Neurocomputing* 65 (2005): 153-159.

SKILLS

- Coding: Python, Matlab, C/C++, Bash,
- Machine Learning: Convolutional Networks, PCA, ICA, Logistic Regression, Linear Regression, SVM, Clustering
- Unix/Linux: creating DHCP servers, configuring NFS drives, cloning/resizing disks, custom network settings

LEADERSHIP AND VOLUNTEERING

- 2016 Member of Northern California ARCS Scholar Alumni Leadership Council
- 2004 President and Founder, 2005 President, 2006 Advisor; Latino/a Association of Graduate Students in Engineering and Science, Student Chapter, University of Arizona
- 2006 Key Note Speaker; Committee Luncheon, Achievement Rewards for College Scientists, Phoenix Arizona Chapter
- 2007 Member of the Executive Committee of the Pastoral Council; The St. Thomas More Catholic Newman Center, University of Arizona
- 2007 Planetarium Operator; The Flandrau Science Center, University of Arizona

AWARDS

- Misha Mahowald Prize for Neuromorphic Engineering (March 2016)
- Recognized as an Outstanding Graduate Student by U of A President, Board of Regents (January 2008)
- Achievement Rewards for College Scientists Foundation award and $19,500 prize (eligibility: top 2% grad students; August 2004)
- National Science Foundation IGERT Fellowship (merit base; $27,000 stipend; August 2003)
- Frank Jarrett Most Outstanding Mechanical Engineering Design; earned most student votes for "best machine design" and $200 cash award (December 2001)