

Curriculum Vitae

Manu S. Madhav

Postdoctoral Research Scholar
The Zanvyl Krieger Mind/Brain Institute
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Contact

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Education

- Ph.D. in Mechanical Engineering (May 2014)
Johns Hopkins University (JHU), Baltimore, MD, U.S.A.
Advisor: Prof. Noah Cowan
- M.S.E. Mechanical Engineering (May 2010)
Johns Hopkins University (JHU), Baltimore, MD, U.S.A.
- B.Tech. Mechanical Engineering (May 2008)
National Institute of Technology Calicut (NITC), Calicut, Kerala, India

Research Experience

- (2013 –) Currently working on quantifying aspects of spatial navigation in rats by recording place cells and grid cells in a novel virtual reality experimental rig, in a joint project with Profs. Jim Knierim and Noah Cowan (JHU), and Hugh T. Blair (UCLA).
- (2009 –) Worked with Profs. Noah Cowan (JHU) and Eric Fortune (NJIT) on several problems related to modeling multisensory behaviors in weakly electric knifefish. Modeling the Jamming Avoidance Response (JAR) and the discovery of the Social Envelope Response (SER) in these fish comprised my doctoral thesis.
- (2012 –) Exploring the role of MSTd in primate navigational tasks, in a joint project with Profs. Charles Duffy and Bill Page (Univ. Rochester) and Noah Cowan (JHU).
- (2008 – 2009) As a member of Prof. Allison Okamura's Haptics Lab, helped in designing and conducting a human subject study for determining the efficacy of vibration feedback to the feet.

- (2007 – 2008) Designed and fabricated a 20-DOF servo-based humanoid robot, as the senior undergraduate project.
- (2006 – 2007) Designed and fabricated a mobile manipulator arm, as the junior undergraduate mini-project.

Teaching Experience

- (Spring 2012) Teaching Assistant for JHU graduate course “System Identification”.
- (Intersession 2012) Taught a three-week course entitled “The Kalman Filter” at JHU.
- (Fall 2009) Teaching Assistant for JHU graduate course “Introduction to Linear Systems”.
- (Fall 2008, Spring 2009) Teaching Assistant for two semesters of “Freshman Experiences in Mechanical Engineering”, an introductory class for Mechanical Engineering freshmen at JHU.

Publications

Thesis

Manu S. Madhav. “Nonlinear processing of sensory interference drives social behavior in weakly electric fish”. Doctoral thesis, Johns Hopkins University, 2014.

Journal Papers

- Noah J. Cowan, M. Mert Ankarali, Jonathan P. Dyrh, Manu S. Madhav, Eatai Roth, Shahin Sefati, Simon Sponberg, Sarah A. Stamper, Eric S. Fortune, and Thomas L. Daniel. “Feedback control as a framework for understanding tradeoffs in biology”. arXiv:1402.5702, 2014.
- Manu S. Madhav, Sarah A. Stamper, Eric S. Fortune, and N. J. Cowan. “Closed-loop stabilization of the jamming avoidance response reveals its locally unstable and globally nonlinear dynamics”. J Exp Biol, 2013.
- Sarah A. Stamper*, Manu S. Madhav*, Noah J. Cowan, and Eric S. Fortune. “Beyond the Jamming Avoidance Response: Weakly electric fish respond to the envelope of social electrosensory signals”. J Exp Biol, 2012. *Contributed equally. Ranked as one of the top 3 publications in 2012 in J Exp Biol. Highlighted in Inside JEB: “GREGARIOUS ELECTRIC FISH ADJUST TO MAINTAIN SOCIAL ENVELOPE”

Refereed Conference Papers

- N. Gurari, K. Smith, M. Madhav, and A. M. Okamura, “Environment Discrimination with Vibration Feedback to the Foot, Arm, and Fingertip”, 11th International Conference on Rehabilitation Robotics (ICORR), 2009.

Magazine Articles / Opinion Pieces

- M. Madhav, R. Nickl, “Mimicry or Scrutiny? Striking a Partnership Between Engineering Design and Biological Research,” Potentials, IEEE , vol.34, no.2, pp.26,32, March-April 2015

Abstracts / Talks

- “Analysis and identification of rhythmic (hybrid) dynamic behaviors”, Spring 2014 Eastern Sectional Meeting of the American Mathematical Society, Baltimore, U.S.A.
- “Frequency tracking and spatial localization of unconstrained weakly electric fish reveal complex social interactions in natural populations”, Society for Integrative and Comparative Biology (SICB) annual meeting 2014, Austin TX.
- “Beyond the Jamming Avoidance Response: Weakly electric fish respond to the envelope of social electrosensory signals”, Society for Integrative and Comparative Biology (SICB) annual meeting 2014, Austin TX.
- “Stride-to-Stride vs. Step-to-Step return maps for human running”, International Symposium on Adaptive Motion of Animals and Machines (AMAM) 2013, Darmstadt, Germany.
- “Contribution of self-movement cues in MSTd due to optic flow and object motion”, Neuroscience 2012, New Orleans, U.S.A.
- “Social envelope responses (SERs) in *Eigenmannia* and *Apteronotus*”, Neuroscience 2012, New Orleans, U.S.A.
- “Beyond the Jamming Avoidance Response: Weakly electric fish respond to the envelope of social electrosensory signals”, International Society for Neuroethology 2010, College Park, U.S.A.
- “Weakly electric fish change their electric organ discharges in response to electrosensory envelopes.”, Neuroscience 2011, Washington D.C., U.S.A.
- “A linear behavior: Understanding the JAR”, Annual Mont St. Hilaire Conference on Electrosensory Processing 2011, Mont St. Hilaire, Quebec, Canada.
- “Identifying an unstable sensorimotor behavior: The Jamming Avoidance Response in *Eigenmannia*”, COSYNE 2011, Salt Lake City, U.S.A.
- “Envelope avoidance response in weakly electric fish”, International Society for Neuroethology 2010, Salamanca, Spain.
- “Balancing the Jamming Avoidance Response: Closed-loop identification of an unstable sensorimotor behavior”, Neuroscience 2009, Chicago, U.S.A.

Co-curricular Experience

- Editor of the “The Johns Hopkins University GRO Guide to Living in Baltimore”. (2012 – 2014)
- Served as Chair of the Graduate Representative Organization (GRO), which represents all Graduate Students in Arts & Sciences and Engineering at JHU. (2010 – 2011)
- Communications chair for the GRO. (2009 – 2010, 2011 – 2012)
- Worked for two semesters as a Study Consultant with Academic Advising, JHU.
- Secretary of IEEE Student Branch, NITC. (2007 – '08)
- Sponsorship Head for FOSSMeet@NITC 2008, recognized as the fourth largest open source community event in India.