

# MEGHANA V HONNATTI

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## OBJECTIVE

To obtain a full-time position related to research and product development in the medical device and bioengineering sector that leverages my skills in micro- and nanotechnology, MEMS, microfluidics and lab-on-a-chip devices.

## TECHNICAL SKILLS

- **Microfabrication:**
  - **Processing:** Class 1,000-100,000 cleanroom; Process plan; Mask layout, printing; Photolithography; Physical Vapor Deposition (sputtering, thermal evaporation of metal thin films); Electroplating; Wet/dry etching (Reactive Ion Etch, microwave and RF plasma etching); Soft lithography; Wafer cleaning; Surface modification (plasma treatment and PEG triblock copolymer)
  - **Testing and Characterization:** Scanning Electron Microscope, Umech MEMS Motion Analyzer, Nanospec thin film measurement system, Surface profilometer, Contact angle goniometer, Syringe pump
- **Biomedical Engineering:**
  - **Bioinstrumentation:** Micro/nanomanipulation; Micro/nano-injection; Electrophysiology (patch clamping, carbon fiber amperometry); Electrochemistry; Optical microscopy (confocal, fluorescence, DIC); Micropipette puller
  - **Biology:** Cytotoxicity assays, Fluorescence labeling (FM, Fura, Mitotracker, LysoTracker, Texas Red, PI); Antibody labeling (biotin/streptavidin complex); Cell culture (Normal Rat Kidney, INS-1, Bovine Adrenal Chromaffin cells); Cytometry
- **Electrical Engineering:**  
Signal, image and sound processing; Statistical data analysis; Digital & analog circuit design
- **Computer Skills:**  
AutoCAD, Freehand, SolidWorks, LASI, PULSE, Igor Pro, MATLAB, C, C++, Visual Basic, EndNote, Microsoft Office (Word, Excel, PowerPoint, Project)

## WORK EXPERIENCE

Zyvex Corporation, Richardson, TX  
Biomedical Engineer

Nov 2005 – May 2007

- **Microfabrication for Neural Engineering Applications**
  - DARPA DSO funded program for developing neural interfaces for prosthetic upper limb.
  - Designed and microfabricated implantable SU-8/Au MEMS multi-electrode arrays and conducted growth curve experiments with NRK cells to test for *in vitro* biocompatibility.
  - Designed and fabricated implantable SU-8 regenerative multielectrode interfaces and assembled them to form 3-dimensional implants for increased contact area with neurons.
  - Built and tested planar and 3-dimensional polymeric nerve guides for *in vitro* and *in vivo* studies.
  - Contributed to brainstorming, designing and troubleshooting stages of the fabrication of glass multielectrode arrays.
- **Nanomanipulator Applications & Product Development**
  - **Product Development:** Coordinated product transition from generation 1 to 3 through collaborations, customer feedback, attending trade shows and conferences and through interactions with design and sales & marketing teams.
  - **Applications Development:** Led nanomanipulator applications development such as cellular nanosurgery, nano-injection and directed cellular manipulation by leading experimentation and end-effector development.
  - Performed drift measurements on nanomanipulator motors using the Umech motion analyzer and in-house developed Michelson's Interferometer.
  - Facilitated new equipment ordering, set-up, calibration, training, SOP and super user.
- **Other Projects**
  - Built a bench-top prototype of an orthopedic sensor for daily wireless monitoring of bone growth in patients with congenital bone deformities; tested for read distance, accuracy and repeatability.
  - Conducted *in vitro* growth curve experiments for NRK cells in single-walled carbon nanotube dispersions.
  - Coordinated routinely with a multidisciplinary team consisting of chemists, molecular biologists, engineers, neuroscientists and surgeons in industry, university and hospitals.
  - Participated in new product development through prototype building, market research and literature review.
  - Generated data for and presented at conferences, quarterly reviews; Trained and mentored colleagues and interns.

• **BioMEMS Device Fabrication and Testing**

- Designed and fabricated poly(dimethylsiloxane) (PDMS) microfluidic channels; performed photolithographic patterning, replica molding and surface modifications.
- Devised a method for rapid solution exchange time around a cell and the measurement thereof.
- Engineered a method for accurate measurement of the departing rate constants of fluorescent markers from cell membranes; the measured rate was 10X faster than by previous methods.
- Optimized the designs to reduce data variability (~75%), testing time (>50%) and analysis time (~70%), and improve exchange rate (10X faster).
- Developed software algorithms in Igor Pro for data analysis.

• **Other Projects**

- Performed electrical and amperometric characterization of Au and Ag electrodes on micromachined silicon biochips and subsequent neurostimulation and recording of neurotransmitters in endocrine cells.
- Performed electrochemical characterization of titanium nitride and diamond like carbon by amperometry and cyclic voltammetry.
- Conducted single cell patch-clamping experiments to obtain membrane capacitance measurements.
- Trained and mentored PhD and undergraduate students on microfluidic device design, processing and testing.

**EDUCATION**

**MS in Electrical Engineering**, GPA: 3.6/4.0

**Aug 2002 – Dec 2004**

University of Missouri – Columbia, USA

**Thesis Title:** Microfluidic Devices for Rapid Solution Exchange

**Advisor:** Dr. Kevin D. Gillis

**BE in Electronics Engineering**, GPA: 3.7/4.0

**Aug 1998 – May 2002**

Pune University, India

**PUBLICATIONS & PRESENTATIONS**

1. T. Kmecko, **M. Honnatti** and G. Hughes. “Three-dimensional Carbon Nanotube Hybrid Neural Interface for Efficient Charge Transport”, **Nanotech 2007**, 10th Annual Meeting, Santa Clara, CA, May 2007.
2. K. Colinjivadi, J.B. Lee, **Meghana Honnatti**, R. Draper, M. Ellis, G. Skidmore, and G. Hughes, “Polymer microgrippers as end-effectors for biological sample manipulation,” **ASME IMECE 2006** Conference, Chicago, IL, Nov. 2006.
3. H. Hu, **M. Honnatti**, K. D. Gillis, “Microfluidic device for rapid solution exchange to study kinetics of cell physiology”, **American Physics Society (APS)**, 59<sup>th</sup> Annual Meeting of the APS Division of Fluid Dynamics, Tampa Bay, FL, Nov. 2006.
4. **M. Honnatti**, S. Bhattacharya, S. Gangopadhyay, K. D. Gillis. “Measurement of the Kinetics of Dye Dissociation using Microfluidic Devices”, **Biomedical Engineering Society (BMES)**, 15<sup>th</sup> Annual Fall Meeting, Philadelphia, PA, Oct. 2004.
5. G. A Hughes, **M. Honnatti**, “Profile on Zyvex Corporation”, **Nanomedicine**, June 2006, Vol. 1, No. 1, Pages 139-143.
6. **M. Honnatti**, G. Hughes, “Intracellular Nanosurgery” Application Note 9721.
7. **M. Honnatti**, G. Hughes, K. Colinjivadi, J. B. Lee, “Directed Cellular Manipulation using Polymer Grippers” Application Note 9720.
8. **M. Honnatti**, G. Hughes, R. Draper, “Enabling Subcellular Nanosurgery: An Application Overview”, Application Note 9719.