

# Naveen Agnihotri

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## Education

PhD, Neurobiology and Behavior, Columbia University, 2002.

MS, Dept of Engineering, University of Georgia, 1996.

BE, Computer Engineering, University of Delhi, India, 1994.

## Research Interests

The role of neuromodulators on brain function, both at the level of single synapses, as well as at the level of large networks. The aim of such research is to understand how brain chemicals produce effects as diverse as cognition, anxiety, and pain suppression. I am interested in experimental approaches in both *in-vivo* and *in-vitro* preparations.

## Research Experience

10/02-present

Postdoctoral Research Fellow, Department of Brain and Cognitive Sciences, MIT.

- Investigation of the effects of reward systems and neuromodulators in neural networks *in-vitro*. Exploration of non-Hebbian plasticity mechanisms and their role in the dynamics of large neuronal networks.

9/96-9/02

Research Assistant, Center for Neurobiology and Behavior, Columbia University.

- 1/98-9/02: Recording of place cells in the hippocampus; investigating the effects of neuromodulators and protein synthesis antagonists on the stability of a newly formed place cell map.
- 1/98-6/02: Teaching neuroanatomy at the College of Physicians and Surgeons, Columbia University.
- 7/97-12/97: Cloning of the CamKII $\alpha$  promoter to a native G $\alpha$  subunit in order to obtain mice that constitutively express the native subunit in a spatially regulated manner
- 1/97-6/97: Dual whole cell patch-clamp recordings of cultured rat hippocampal neurons, and study of the late phase of LTP at single vesicle-release sites.
- 9/96-12/96: Imaging of Ca<sup>2+</sup> in whole olfactory epithelium, to see the change in Ca<sup>2+</sup> dynamics as the epithelium responds to odors.

9/94-8/96

Research Assistant, Department of Engineering, University of Georgia.

- Investigation, quantification, and analysis of cAMP and Ca<sup>2+</sup> levels in cells when stimulated by analogs of sensitization and associative learning.
- Developed image processing techniques for sorting of bioproducts based on age and moisture content.
- Developed model techniques for detecting firmness of biological tissue using novel firmness sensors.

3/93 - 6/94

Undergraduate research assistant, Department of Computer Engineering, Delhi Institute of Technology, India.

- Investigation of hamiltonian properties of the Kronecker and Strong product of graphs, particularly cycles and trees (acyclic graphs). This work culminated in several contributions, which find high applicability in a host of computer science, physical and biological systems.

4/92 - 7/94

Undergraduate research engineer, PRAVAK Cybernetics (P) Ltd, New Delhi, India.

- Extensive study of the kinematics and dynamics of the PRAVAK Robot Arm (It is a 5-degree freedom PUMA-type arm with revolute joints).
- Development of new methods of implementing smooth movement using advanced control techniques.
- Design and development of a new robot arm with "intelligent" controllers and superior accuracy.

### Refereed journal articles

Naveen T Agnihotri, Robert D Hawkins, Eric R Kandel and Clifford Kentros. 2004. The Long-Term Stability of Hippocampal Place Fields Requires New Protein Synthesis. *Proceedings of the National Academy of Sciences*. **101**(10):3656–3661.

Clifford G Kentros, Naveen T Agnihotri, Samantha Streater, Robert D Hawkins and Eric R Kandel. 2004. Increased Attention to Spatial Context Increases Both Place Field Stability and Spatial Memory. *Neuron*. **42**(2):283–295.

Naveen Agnihotri, William S Kisaalita and Charles H Keith. 1999. A micro-perfusion chamber for imaging cultured cells. *Biotechniques*. **27**(4):722–726.

Naveen Agnihotri, Juan Carlos López-García, Robert D Hawkins and Ottavio Arancio. 1998. Morphological Changes Associated with LTP. *Histology and Histopathology*. **13**(4):1155–1162.

Naveen Agnihotri, William S Kisaalita and Charles H Keith. 1997. Free Cyclic AMP Increases in PC12 Cells on Depolarization. *Journal of Neuroscience Research*. **47**(5):555–560.

Pranava K Jha, Naveen Agnihotri and Rajesh Kumar. 1997. Long cycles and long paths in the Kronecker product of a cycle and a tree. *Discrete Applied Mathematics*. **74**(2):101–121.

Pranava K Jha, Naveen Agnihotri and Rajesh Kumar. 1996. On edge exchanges in Hamiltonian Decompositions of Kronecker-product graphs. *Computers and Mathematics with Applications*. **31**(2):11–19.

### Teaching

Neuroanatomy instructor at the College of Physicians and Surgeons of Columbia University for five years, from 1998 to 2003.

### Membership in professional and other organizations

- Society for Neuroscience, since 1998.
- IEEE, since 1990.
- AAAS, since 1995.
- Executive Member, Computer Society of DIT, 1993-94.

### **Other work experience**

- 1999-2001, principal database engineer and administrator for a web services company based in New York. Wrote two database-backed websites, Artpopuli and Digital Echo, and built and configured the Linux Server and Oracle database installation that supported them.
- Geometrical transformation of digital images: As a six-month computer graphics project, developed and implemented a new algorithm for general-purpose transformation of digital images, which performs better (and faster) than other existing algorithms.
- Software for Chromatography: As a professional venture, developed a fully functional software that forms a data acquisition and on-line processing system for a gas/liquid chromatograph. This work, done as a summer project in 1992, involved extensive and exhaustive study of the principles and practices of modern chromatography. This software is being marketed by PRAVAK Cybernetics to date.
- Extensive experience of simulation and modeling, and programming using various high and low level languages like C/C++, java, perl, tcl, assembly etc.

### **Honors and Awards**

- One of ten recipients of the AAAS Denise Weiner Memorial Fund, to attend the 1995 AAAS meeting and Annual Exposition.
- Graduate School Award, University of Georgia, 1994-1995.
- Graduate School Award, University of Georgia, 1995-1996.
- Dean's assistantship enhancement based on merit, University of Georgia, 1995-1996.
- First prize, INTECH '93, National paper presentation contest, Regional Eng. College, Kurukshetra, India.
- Best paper award, Second IEEE student conference, 1993, Delhi Institute of Technology, Delhi, India.

### **Extra-curricular activities**

- President, Graduate Student Club, Dept of Engineering, University of Georgia.
- Chief Editor, "Silika", magazine of the Computer Society, DIT.
- Sports: Tennis, Chess, Badminton, Table tennis.
- Music/Drama: Classical guitar, percussion, short plays.