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# Karthik Nagarajan

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<b>Objective</b>	Seeking an Internship/Co-op position in the field of signal processing/computer architecture applied to problems in remote sensing, image processing and machine learning	
<b>Education</b>	<ul style="list-style-type: none"><li>▪ <b>Ph.D. (Ongoing)</b>, Department of Electrical and Computer Engineering University of Florida, Gainesville Dec '03 - Present</li> <li>▪ <b>Master of Science</b>, Department of Electrical and Computer Engineering University of Florida, Gainesville GPA: <b>3.9/4.0</b> Apr '05 <i>Award for Academic Excellence – GPA of 4.0, 2003 –2004</i></li> <li>▪ <b>Bachelor of Engineering</b>, Electronics and Communication Engineering University of Madras, India GPA: <b>4.0/4.0</b> Apr '03 <i>Award for Academic Excellence – GPA of 4.0, 1999 –2003</i></li></ul>	
<b>Experience</b>	<ul style="list-style-type: none"><li>▪ <b>Research Assistant with Dr. K.C. Slatton</b>, University of Florida Dec '03 – Present  Adaptive Signal Processing Laboratory, Department of Electrical and Computer Engineering<ul style="list-style-type: none"><li>- Stream flow time series prediction using pattern recognition / information theory concepts</li><li>- Development of algorithms for multi-scale data fusion of InSAR and LIDAR datasets</li><li>- Study of topography tracked by multi-model Kalman filters regulated by a mixture of experts network</li><li>- Land classification/ data segmentation based on spectral analysis</li><li>- Estimation of terrain complexity from fractal features</li></ul></li> <li>NSF Center for High-Performance Reconfigurable Computing (CHREC), Department of Electrical and Computer Engineering Aug '06 – Present<ul style="list-style-type: none"><li>- Development of key signal and image processing cores for FPGA platforms and studying performance tradeoffs like latency, quantization and degree of parallelism</li></ul></li> <li>Airborne Laser Swath Mapping Laboratory, Department of Civil and Coastal Engineering Jan '06 – Aug '06<ul style="list-style-type: none"><li>- Data analysis on University of Florida' Photon counting LIDAR system – CATS (Coastal Area Tactical-mapping System) and analysis of corduroy artifacts in ALSM datasets</li></ul></li> <li>▪ <b>Grader</b>, Department of Electrical and Computer Engineering, University of Florida Jan '06 – Apr '06<ul style="list-style-type: none"><li>- Assisted and graded a graduate level course on pattern recognition. Duties included preparation of lecture materials and sample simulations for illustration of theory</li></ul></li> <li>▪ <b>Internship</b> at VI Microsystems, India Oct '02 – Mar '03<ul style="list-style-type: none"><li>- Designed and tested the Centralized Intrusion Detection (CID) project, an embedded based intelligence system built on a Philips 89C51RD2 microcontroller</li></ul></li> <li>▪ <b>Assisted in reviewing submissions</b> for IEEE International Conference on Image Processing, ICIP – '04,'05 and IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP – '06</li></ul>	
<b>Selected Publications</b>	<ul style="list-style-type: none"><li>▪ K. Nagarajan and K. Clint Slatton, "Multiple-Model MKS with Improved Learning /Prior Modeling", <i>Proc. IEEE International Conference on Image Processing (ICIP)</i>, 11-14 Sept. 2005, vol. 1, pp.757-760</li> <li>▪ V. Aggarwal, K. Nagarajan, K. C. Slatton, "Multiple-Model Multiscale Data Fusion Regulated by a Mixture-of-Experts Network," <i>Proc. IEEE International Geoscience and Remote Sensing Symposium (IGARSS)</i>, Sep. 2004, vol. 1, pp. 364 – 367</li> <li>▪ K. C. Slatton, K. Nagarajan, V. Aggarwal, H. Lee, W. E. Carter, R. Shrestha, "Multiscale</li></ul>	

Estimation of Terrain Complexity Using ALSM Point Data on Variable Resolution Grids,” *IAG International Association of Geodesy Symposia: Gravity, Geoid and Space Missions (GGSM)*, invited, Aug., 2004, vol. 129, pp. 224-229

- V. Aggarwal, K. Nagarajan, S. Cheung, H. Jhee, K. Seo, and C. Slatton, “Multiscale Data Fusion Regulated by a Mixture-of-Experts Network”, Amer. Geophysical Union (AGU) - Fall Mtg., Poster G11A-0246, San Francisco, CA, Dec. 2003

## Projects

- **Design of SRAM Chip** Nov '06 – Dec '06
  - Designed a 6x6 SRAM in 0.25u CMOS technology with schematics and simulations in Cadence and SPECTRE. Cost analysis was also performed
- **Bayesian Network on March Madness** Feb '06 – Mar '06
  - Developed a directed acyclic graphical model based on a Bayesian network for predicting the 2006 March Madness tournament results in MATLAB
- **Small Scale Change Detection Techniques for LIDAR Measurements** Jan '05 – Apr '05
  - Principle Component Analysis was employed to detect small scale (<0.1m) changes which were quantified from probability densities calculated using Parzen windows
  - Co-developed a simulation tool in MATLAB for defining ground terrain scenes for generating simulated LIDAR measurements using ray tracing techniques
- **Analysis, Development and Modeling of DSP Algorithms on TI Signal Processors** Jan '05 – Apr '05
  - Implemented linear predictive coding and edge detection algorithms on Texas Instrument's TMS320C6713 DSP with CCS Version 2.2 for DSP code development
  - A comparative study on employing various buffer management schemes for real time applications was detailed
- **Range Segmentation Based on Normalized Cut Graphs** Nov '04 – Dec '04
  - Segmented 3D range data under noisy environment based on graph cut methods.
  - Collected real data on ILRIS 3D, a ground based LIDAR system. Simulations and algorithm development were done in MATLAB
- **Edge Detection and Interpolation** Sep '04 – Oct '04
  - Coded a canny edge detector in MATLAB for extracting edges under various noise conditions. Cubic splines were designed for interpolating the results of edge detection
- **Echo Cancellation Using Gamma Filter** Mar '04 – Apr '04
  - Designed an FIR/IIR filter (Gamma Filter) to remove echoes from a telephone line
- **Hybrid Mobility Management Scheme for Mobile Adhoc NETWORKS (MANETS)** Feb '04 – Apr '04
  - Proposed a hybrid of cluster, randomized database group and uniform quorum system methods for location management in hierarchically organized adhoc networks
  - Quantitative studies suggested an improvement in scalability with lower overheads
- **Adaptive Noise Cancellation Using LMS (Least Mean Square) Algorithm** Feb '04 – Mar '04
  - Designed an adaptive filter in MATLAB based on the LMS and NLMS algorithms to remove vacuum cleaner noise from a music signal. Performance analysis was detailed and methods for selecting optimum filter parameters were proposed

<b>Coursework</b>	Digital/Adaptive Signal Processing	VLSI/Remote Sensing	Wired/ Wireless Networks
	Computer Vision / Digital Communication	Fluid Flow in Environmental Systems	Noise in Linear Systems
<b>Skills</b>	Software / Simulation tools	- MATLAB, Active HDL, Xilinx ISE, AccelDSP, Cadence, 8085/86 Assembly Language, Code Composer Studio CCS V2.2	
	Languages	- C/C++, Visual Basic, VC++, Java, ASP	
	Database Technologies / Operating Systems	- SQL Server 7.1, MySQL / Linux, Win. NT/XP	
	Web Design Tools	- Flash MX, DHTML, CGI, Scripting languages	

## Honors

- University **Gold Medalist**, Electronics and Communication Engineering (B.E), 1999-2003
- Diploma in Information Technology, DNIIT, National Institute of Information Technology, NIIT, 2000-2002
- Best outgoing Undergraduate student, 1999-2003
- Student member of IEEE