Arun Avudainayagam, Ph.D.

3009 SW Archer Rd.
Apt. D15
Gainesville, FL-32608

Phone: (352) 871 3645
email: arun@dsp.ufl.edu
http://plaza.ufl.edu/nayagam

OBJECTIVE

Self-motivated and results-oriented professional seeking full-time opportunities in the product-driven research and development of physical layer technologies for next-generation communication systems.

EDUCATION

- **Ph. D**. in Electrical and Computer Engineering, University of Florida, **May 2006**
  Dissertation Topic: Cooperative diversity in wireless networks using soft-input soft-output decoders **GPA: 4.0**
- **Master of Science** in Electrical and Computer Engineering, University of Florida, **Dec. 2001**
  Thesis: DEAR: A device and energy aware routing algorithm for heterogeneous ad hoc networks **GPA: 4.0**
- **Bachelor of Engineering** in Electronics and Communication Engineering, Anna University, India , **May 2000**
  Thesis: Analysis of Jitter in ATM networks handling self-similar traffic **G.P.A: 9.16/10**

  Course work includes: Space-Time Coding for Wireless Communications, Error Control Coding, Multimedia Communication, Spread Spectrum and CDMA, Wireless Networks, Statistical Decision Theory, Queueing Theory, Cellular Mobile Communication, Image Processing

EXPERIENCE

- **Interim Engineering Intern**, WCDMA Performance Test, Qualcomm Inc., **Jun. 2005-Dec. 2005**
  Worked in the areas of WCDMA/inter-RAT idle cell-reselection and inter-frequency compressed-mode handover. Performed regression and controlled tests focusing on access stratum performance of Qualcomm's WCDMA chipsets. Suggested optimizations to improve the idle cell-reselection performance of the modem chips. Developed automation scripts and test-suites using Perl. Performed field-tests in Cingular's WCDMA network at Seattle and Fort-Worth.
- **Research Assistant**, Wireless Information Networking Group, University of Florida, **Jan. 2002-May 2005**
  Designed and analyzed various cooperative diversity schemes wherein a group of nodes equipped with a single antenna achieve spatial diversity through collaboration. Experience with Turbo codes, LDPC codes, Turbo Product Codes, Convolutional Codes and associated decoders
- **Invited Lecturer** for the course *EEL 6550: Error Control Coding*, University of Florida, **Oct. 2003**
  Instructed a graduate class on the fundamentals of soft-decision decoding of block codes. Topics included MAP decoding of block codes and iterative decoding of turbo product codes and LDPC codes.
- **Teaching Assistant**, Dept. of Electrical and Computer Engg. , Univ. of Florida, **Aug.2000-Dec.2001**
  Responsibilities included teaching fundamentals of circuit theory, directing lab experiments, student evaluation through exams and homeworks, holding office hours and grading.
- **Project Leader**, Telematics Group, Anna University, India, **Aug. 1999-May 2000**
  Responsible for coordination, task-division and supervision of a team of three involved in the study and Matlab simulation of an ATM network handling self-similar traffic.

SELECTED PROJECTS

- **Wyner-Ziv Video Coding**: Developed a video codec wherein all the statistical correlation in the frames of a video sequence is exploited at the decoder. This facilitates the design of a light-weight video encoder suitable of wireless video and sensor applications. A novel trellis structure called the hyper-trellis is proposed to improve the performance of existing video codecs for these applications.
- **DEAR**: Developed a Device and Energy Aware Routing Algorithm called DEAR (GloMoSim Implementation) for heterogeneous wireless ad hoc networks consisting of a few externally powered nodes and many battery powered (energy constrained) nodes. The objective was to maximize the network-partition time.
- **Matlab toolkit for LDPC codes**: Developed a toolkit in MATLAB for the simulation of LDPC codes. Includes functions for encoding and decoding, channel simulations and functions for various operations over binary fields.

- **A Variable Rate Programmable Turbo Encoder**: Scaled down custom design of a Turbo encoder chip that is capable of operating at two different code rates (1/2 and 1/3). Features: 3V Vdd , on-the-fly reconfiguration capability for the constituent encoder, built in self-test, Hewlett Packard (HP) AMOS14TD 0.5µm process.
- **Median Augmentation**: Developed an algorithm called Median Augmentation to clean images corrupted with pepper noise. This paper won the second prize in a national level undergraduate paper presentation contest conducted by IIT-Madras, India.
- **Other Projects**: Matlab implementation of different multi-user detectors for linear DS-CDMA systems, Noise Suppression and Echo Cancellation using LMS and RLS algorithms. A complete list of projects and details is available online at `http://plaza.ufl.edu/nayagam/software.html`

SELECTED PUBLICATIONS

- A.Avudainayagam, J.M. Shea, T.F. Wong, and Y.Fang, "Cooperative techniques in wireless communications" in *Design and Analysis of Wireless Networks*, edited by Y. Pan and Y. Xiao, Nova Science Publishers, 2004 (Book Chapter).
- A.Avudainayagam, J.M. Shea, and T.F. Wong "Collaborative decoding of a broadcast message in bandwidth-constrained environments," Submitted to *IEEE J. Selected Areas in Communication*.
- A.Avudainayagam, J.M. Shea, and D. Wu "Decoder design for pixel-domain Wyner-Ziv video coding," Submitted to *IEEE Tran. Circuits and Systems for Video Technology.*
- A.Avudainayagam, Y.Fang, and W.Lou, "DEAR: A Device and Energy Aware Routing protocol for heterogeneous ad hoc networks," *Journal of Parallel and Distributed Computing*, vol.63/2, pp.228-236, Feb. 2003.
- A.Avudainayagam, J.M. Shea, and D. Wu, "A Hyper-Trellis based Turbo Decoder for Wyner-Ziv Video Coding," in *Proc. 2005 IEEE Global Telecommunications Conference*, (St. Louis, MO), pp.1412-1417, Nov. 2005.
- A.Avudainayagam, J. M. Shea, and A. Roongta, "Improving the Efficiency of Reliability-Based Hybrid-ARQ with Convolutional Codes ," in *Proc. 2005 IEEE Military Commun. Conf,,* (Atlantic City, NJ), pp.1-7, Oct. 2005.
- A.Avudainayagam, J.M. Shea, and A.Roongta, "On approximating the density function of reliabilities of the max-log-MAP decoder," in *IASTED International Conference on Communication Systems and Applications*, July 2004.
- A.Avudainayagam, J.M. Shea, and T.F. Wong, "Cooperative diversity through reliability filling," in *Proc. 41st Annual Allerton Conf. on Commun., Control and Comp.*, (Allerton, IL), Oct. 2003.
- A.Avudainayagam, J.M. Shea, T.F. Wong, and X.Li, "Reliability exchange schemes for iterative packet combining in distributed arrays," in *Proc. 2003 IEEE WCNC*, vol.1, pp.832-837, Mar. 2003.

SKILLS

Operating Systems: Linux, Mosix, Solaris,OS X, Windows,
Programming Languages: C, C++, Java
Math Tools: Matlab, Mathematica
Simulation Tools: GloMoSim, OpNet, PSpice
Web Technologies: HTML, JavaScript
Scripting tools: Perl

AVAILABILITY

June 2006

VISA STATUS

F1 Visa

REFERENCES (Dept. of Electrical and Computer Engineering, University of Florida)

Dr. John M. Shea
Associate Professor
Phone: (352) 846-3042
Email: jshea@ece.ufl.edu
URL: www.wireless.ece.ufl.edu/~jshea

Dr. Tan F. Wong
Associate Professor
Phone: (352) 392-2665
Email: twong@ece.ufl.edu
URL: www.wireless.ece.ufl.edu/~twong

Dr. Dapeng Wu
Assistant Professor
Phone: (352) 392-4954
Email: wu@ece.ufl.edu
URL: www.wu.ece.ufl.edu

- Qualcomm references available on request.