**Ravi Shankar, PhD, MBA, PE, Fellow (AHA)**

Director, Center for Systems Integration (CSI) shankar@fau.edu

Professor, Comp. and Elec. Eng. and Comp. Science (CEECS) Off: (561) 297-3470

Florida Atlantic University (FAU), Boca Raton, FL 33431 Cell: (561) 306-5625

Profile: <http://faculty.eng.fau.edu/shankar/> Research: [http://csi.fau.edu/](http://csi.fau.edu/%20%20%20)

Team course sites: [http://android.fau.edu/](http://android.fau.edu/%20) , <http://robotics.fau.edu/>, <http://semanticweb.fau.edu/>

Github open source App site: <https://github.com/RShankar?tab=repositories>

LinkedIn profile: <https://www.linkedin.com/in/shankar2015>

**Objective:**

Contribute to progress on issues of national importance by leveraging my various strengths in

* Technology (systems, engineering, medicine, algorithms, semantic web, and automation),
* Education (STEM education, eLearning and interdisciplinary collaboration), and
* Management (innovation, management, leadership, industry experience, and grantsmanship)

**Experience:**

**Education:** Data Science Certificate, Coursera (non-degree), Johns Hopkins U, Oct 2015 (expected)

MBA, College of Business, Florida Atlantic University, Boca Raton, FL, May 2000

PhD, Electrical and Computer Engineering, University of Wisconsin, Madison, 1982

M.S, Electrical and Computer Engineering, University of Wisconsin, Madison, 1977

**Employment and Professional Experience:**

* **2012-2013,** *Sabbatical,* On building a consortium for smart phone and mobile Apps ([CUSP](http://faculty.eng.fau.edu/shankar/vision/))
* **1993-Present,** *Director,* [*CSI*](http://csi.fau.edu/)*,* a center for multi-college university-industry collaboration
* **1982-Present,** *Promoted and Tenured, Assistant to Full Professor,* CEECS disciplines, FAU
* **2009-Present,** On multi-college teaching coordination to help [student teams](http://faculty.eng.fau.edu/shankar/research/smart-phone-apps/) develop Apps
* **2003-2008,** *Research Director,* Motorola Grant ($1 M). Increased [design productivity](http://faculty.eng.fau.edu/shankar/approach/) six fold
* **2001-2002,** *Senior Consultant,* Cadence Design Systems, leading maker of chip design software
* **1998-1999,** *Sabbatical,* On rapid and low cost prototyping for [STEM](http://csi.fau.edu/?page_id=43) hands-on experience.
* **1991-2002,** *Consultant*, Vasocor, on clinical studies for [early prediction](http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=0&f=S&l=50&TERM1=Shankar&FIELD1=INNM&co1=AND&TERM2=Boca+Raton&FIELD2=INCI&d=PTXT) of atherosclerosis
* **1992-1993,** *Research Director,* Vasocor Grant ($750K), on medical imaging for atherosclerosis.
* **1986-2008,** *Consultant,* IBM, APTEK, Harris, and Motorola, on engineering design automation.
* **1977-1982,** *Teaching & Research Assistant*, Elec. and Comp. Eng., U of Wisconsin, Madison, WI

**Teaching Experience:**

* **2008- Present,** [*Mobile Applications*](http://csi.fau.edu/?page_id=99)**,** based on open source tools for Google's [Android](http://android.fau.edu/), Arduino for [robotics](http://robotics.fau.edu/), Jena and Protégé for the [semantic web](http://semanticweb.fau.edu/), and EMF for [auto code](http://csi.fau.edu/?page_id=95) generation.
* **2000-2007,** *System on a chip (SoC)***,** with courses on Network on Chip, Concurrency, SystemC for mixed-signal systems, Design and Verification, and Biologically Inspired Architectures.
* **1999-2000,** *Innovation***,** with course on new product development, College of Business
* **1986-1999***, VLSI***,** with courses on Microelectromechanical Systems (MEMS), Neural VLSI; Low Power Design, Silicon-on-Insulator (SOI), Structured VLSI Design; Introduction to VLSI
* **1982-1992,** *Computer**Architecture,* with courses onEmbedded System Design, Concurrent Processing, Neural Networks, Microcomputers, Digital Computer Architecture
* **1985-2000,** *Engineering Design Automation*, with courses on CAD-Based Computer Design , Structured Digital Design; Computer Hardware Design, Semi-custom VLSI Design in DSP
* **1982-1985,** *Data Acquisition*, Data Acquisition and Measurement Systems and Biomedical Instrumentation Lab ( at the Univ. of Wisconsin-Madison)

**Scholarly Achievements**

**Statement of Professional Interests:** Mobile Systems, System Complexity, Semantic and Intelligent web, Engineering Design Productivity, Systems Integration, Concurrency Modeling, SoC (System-on-a-chip) Design, VLSI (analog, digital and neural) Design, Computer Architecture, Distributed Parallel Processing, MEMS, and Biomedical Engineering.

**Theses and Dissertations Supervised:** 30 MS theses ( 4 on-going) and 9 PhD dissertations (one on-going) in the following domains (current to earlier): Semantic Web, System Modeling, Productivity, Computer Architecture,Concurrency, Artificial Neural Networks, Design Automation, VLSI Design, Instrumentation, and Biomedical Engineering.

**Patents (in Computer and Biomedical Engineering):** Click [here](http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=0&f=S&l=50&TERM1=Shankar&FIELD1=INNM&co1=AND&TERM2=Boca+Raton&FIELD2=INCI&d=PTXT) for details.

* Two patents on highly scaleable multiplier architecture for low power mobile systems. US patents numbers: 7,873,823 (issued in January 2011 and 7080114 (issued in January 2005)
* Five patents on early and/or noninvasive diagnostic methods for atherosclerosis and diabetes. US patent numbers: 8,197,416 (issued in June 2012), 8,185,182 (issued in June 2012), 5,343,867 (issued in September 1994), 5,297,556 (issued in March 1994), and 5,241,963 (issued in September 1993).

**Journal Publications (in Technology and Education):**

* Mitsova, D., Wissinger, F., Esnard, A-M, Shankar, R., and Giles, P., A Collaborative Geospatial Shoreline Inventory Tool to Guide Coastal Development and Habitat Conservation, ISPRS Int. J. Geo-Inf., **2013**, *2*(2), 385-404; doi:[10.3390/ijgi2020385](http://dx.doi.org/10.3390/ijgi2020385)
* Fonoage, M., Cardei, I., and Shankar, R., Mechanisms for Requirements Driven Component Selection and Design Automation, *IEEE Systems Journal*, Vol. 4, No. 3, Sept 2010, pp. 396-403
* Shankar, R., Gopinathan, M., and Webster, J.G., Digital Signal Processing in clinical validation studies with impedance plethysmography, Paper draft, CSI Technical Report, [*csi.fau.edu*](http://csi.fau.edu/?page_id=5).
* Shankar, R., Shao, S.Y., and Webster, J.G., A Fully Automated Multi-Channel Digital Electrical Impedance Plethysmograph, Paper Draft, CSI Technical Report, [*csi.fau.edu*](http://csi.fau.edu/?page_id=5)*.*
* Shankar, R., Webster, J.G., Object-Process Modeling of Glucose Metabolism in Health and Disease, Paper Draft, CSI Technical Report,[*csi.fau.edu*](http://csi.fau.edu/?page_id=5)*.*
* Agarwal, A., Shankar, R., and Iskander, C.,Survey of NoC Architectures and Contributions, Scientific International Journal of Engineering Computing and Architectures,Vol. 3, Issue 1, 2009
* Agarwal, A., Shankar, R., A Concurrency Model for Network on Chip Design Methodology, *Journal of Modeling and Simulation*, Vol. 29, Issue 3, pp. 238-247, 2009
* Agarwal, A., Mustafa, M., Shankar, R., Pandya, A.S., and Lho, Y., A Deadlock Free Router Design for Network on Chip Architecture, *Journal of Korea Institute of Maritime Information and Communication Sciences*, Vol. 11, No. 4, pp. 696 - 706, April 2007
* Shankar, R., Freytag, L., and Alon, D., "A CAE-based Course for Design of Digital Systems," *Computers in Education* *Journal*, ASEE, Vol. 1, No. 3, pp. 76-85, July-September 1991.
* Zhongkai, Z., and Shankar, R, "A Tutorial on CMOS VLSI Design for an Introductory Course," *Computers in Education Journal*, ASEE, Vol. 1, No. 3, pp. 22-30, July-September 1991.
* Shankar, R., and Webster, J.G., "Noninvasive Measurement of Compliance of Human Leg Arteries," *IEEE Trans. Biomed Eng.*, Vol. 38, No. 1, pp. 62-67, January 1991.
* Shankar, R., & Bond, M.G., "Correlation of Noninvasive Arterial Compliance with Anatomic Pathology of Atherosclerotic Nonhuman Primates, " *Atherosclerosis*, Vol. 85, pp. 37-46, Dec 1990
* Pajunen, G., Steinmetz, M., and Shankar, R., "Model Reference Adaptive Control with Constraints for Postoperative Blood Pressure Management," *IEEE Trans.* *Biomed. Eng.*, Vol. 37, No. 7, pp. 679-687, July 1990.

**Books:**

* Agarwal, A., Shankar, R., and Pandya, A.S., Embedding Intelligence into EDA Tools to Meet the Future Technology Trends, in *Integrated Intelligent Systems for Engineering Design*, X. F. Zha and R. J. Howlett (Eds), IOS Press, Amsterdam, Netherlands, 2006, pp. 389-408
* Shankar, R., and Fernandez, E., *VLSI and Computer Architecture*, 490 pages, Academic Press, Inc., August 1989.

**Refereed Conference Proceedings (recent ones):**

* Mitsova, D., Shankar, R., and McAfee, F., Mobile GIS Applications for Coastal Planning, accepted, *AESS 2015, (Assn for Environmental Studies and Sciences)*
* Islam, S., Shankar, R., Freytag, G., and Serrano, M., Empowerment with Informal Learning: Applicatrin of Mobile Technoloty to Teach Computer Science in K-12, *2nd International Conference on Microelectronics, Circuits and Systems, Micro2015*, August 2015, India.
* Shankar, R., Smart Phone Apps to Empower Middle School Students: Building a STEM Pipeline, *Twenty-Second International Conference on Learning*, The Learner Knowledge Community, Madrid, Spain, July 9, 2015
* Donate, K., Shankar, R., Mitsova-Boneva, D., McAfee, F., Searching the World Wide Web – Finding the Right Information the First Time, *122nd Annual ASEE Conference*, Seattle, WA, June 2015
* Shankar, R., Lapix, J., Ploger, D., Augustin, M., Weinthal, C., and Aguerrevere, S., Precision Low-Cost Robotics for Math Education Work In Progress, *122nd Annual ASEE Conference*, Seattle, WA, June 2015
* Shankar, R., Mentor and Mentee Pipeline in Smart Phone App Development, *2014 Annual Mentoring Conference*, at the Mentoring Institute, UNM, Albuquerque, NM, October 2014, presentation at: <https://prezi.com/usdx8fzhyq47/mentoring-pipeleine-smart-phone-apps/?utm_campaign=share&utm_medium=copy>
* Wissinger, F., Shankar, R., and Restrepo, J., Hydrologic Modeling Methodology, *IEEE SysCon*, Ottawa, CA, April 2014
* Carvalho, F., and Shankar, R., Biomedical Signal Processing: Designing an Engineering Laboratory Course Using Low-Cost Hardware and Software, *121st Annual ASEE Conference*, Indianapolis, IN, June 2014
* Shankar, R., McAfee, F., Harris, M., Behara, R., and Fowlkes, J., Android Exchange (AEx) - A Virtual Community for Students on eTeams, submitted to *EEE’13 - The 2013 International Conf. on e-Learning, e-Business, … and e-Government,* Las Vegas, NV, July 2013.
* Shankar, R., McAfee, F., and Harris, M., Smart Phone App Development: A Multi-College Approach, *2013* *Annual Conference, ASEE*, June 2013.
* Shankar, R., Dickson, J., and Mozelny, C., A Tool for ABET Accreditation, *2013 Annual Conference, ASEE*, June 2013.
* Shankar, R., Ploger, D., and Nemeth, A., Robotics: Enhancing Pre-College Mathematics Learning with Real-world Examples, *2013 Annual Conf., ASEE*, June 2013
* Islam, S., Shankar, R., and Freytag, G., Leveraging Semantic Web to Retrieve Customized Medical Information, *IEEE Syscon Conference*, April 2013.
* Ploger, D., Shankar, R., Nemeth, A., and Hecht, S.A.,Exporting EngineeringTechnology Practice to Enhance Pre-CollegeMathematics Learning, Practice Brought Into the Engineering Technology Classroom, *2012 ASEE Gulf Southwest Annual Conf.*, April 2012 El Paso, Texas.
* Borras, J., Shankar, R., and Furht, B., Mobile Technology Consortium (MTC): An Industry-University Alliance, *Conf. on Industry and Education Collaboration*, Phoenix, AZ, Feb. 2013.
* Shankar, R., Borras, J., McAfee, F.X., Harris, M., Ploger, D., Masory, O., Behara, R., Impact of Motorola’s Vision on FAU’s Engineering Curriculum, *Conf. on Industry and Education Collaboration*, Phoenix, AZ, February 2013.
* Islam, S., Freytag, G., and Shankar, R., Intelligent Health Information System to Empower Patient with Chronic Diseases, *IEEE IRI Workshop on Health Informatics*, Las Vegas, 2012.
* Mitsova, D., Esnard, A-M., Shankar, R., Wissinger, F. Viciedo, M., Holding Back the Sea: Approaches toward Shoreline Management and Planning to Reduce Erosion Hazards, Risk and Response: *Sea Level Rise Summit*, Ft. Lauderdale, FL, June 2012
* Shankar, R., Gundel, J., Nemeth, A., Ploger, D., and Hecht, S.A., Robotic Art for STEM, *FCRAR2012*, Boca Raton, FL, May 2012.
* Shankar, R., Ploger, D., Masory, O., and McAfee, F.X., Robotic Games for STEM Education, *ASEE Mid-Atlantic Regional conference*, Temple University, Philadelphia, PA, October 2011
* Shankar, R., McAfee, F., Carvalho, G., Silva, N., and Harris, M., STEM Education with Innovation and Entrepreneurship, *ASEE MidAtlantic Conference*, Temple University, Philadelphia, PA, October 2011
* Shankar, R., Preparing System Engineers of Tomorrow, *ASEE Southeastern Section Annual Conference*, Marietta, GA, April 2009
* Shankar, R.,, and Agarwal, A., KISMET: An Open Source Process for Faculty Participation in ABET Accreditation, *ASEE Southeastern Section Annual Conference*, Marietta, GA, April 2009
* Castellanos, R., Kalva, H., and Shankar, R., Low Power DCT using Highly Scalable Multipliers, *ICIP 2009*, Feb 2009.
* Fonoage, M., Cardei, I., and Shankar, R., *IEEE Systems Conference*, 2009
* Jayadevappa, S., and Shankar, R., The Changing Ways of Computer Science & Engineering Education – A Suitable Pedagogy to Adapt Better, *2009 ASEE Annual Conf. and Exposition*, Austin, TX, June 2009
* Shankar, R., and Islam, S., A Reference Model Based Patient Management System: Opportunities and Challenges, *25th Southern Biomedical Engineering Conference,* May 2009
* Mozelny, C., and Shankar, R., The Health Advisor: Application for Parkinson’s Disease, *25th Southern Biomedical Engineering Conference*, May 2009

**Sponsored Research Cash Grants : $ 4.5 M (Systems: $ 2.4 M, Biomed: $ 1.1M. Royalties: $1M)**

* Shankar, R., Integration of medical device measurements with patient’s EMR, $100K

ARC Devices, August 2015- December 2015

* Citizen Science Apps, Grant from the Museum of Science $18K

and Discovery, Ft. Lauderdale, FL, August 2015

* Integrating Mobile Apps and Robotics into STEM Education, $21K

FAU Tech Fee Grant, October 2013

* A Shore Characterization Tool to extend ARCGIS (PI: Mitsova), FAU, 2012 $10 K
* Android App Development, FAU, 2010 $8 K
* Accelerated Mobile Product Development Co-PI: Agarwal), SBA, 2009-2010 $123 K
* Highly Scaleable Multiplier, GAP Funding from Tech Transfer/FAU, 2007 $15 K
* One Pass to Production (Co-PI: Furht et al), Motorola/iDEN, 2003-2008 $1000 K
* EDA Undergrad Curriculum, Cadence Design Systems, Inc, 2001-2002 $20 K
* Low Power Optimization, SABA Grant, Motorola, 2000 –2001 $22 K
* Advanced System Control (Co-PI: Pajunen), Motorola, 1999 $72 K
* Integration of RF and Digital Design Flow, Harris SemiConductors, 1997 $25 K
* Modularly Expandable Mixed Signal IC Tester, NSF and Motorola 1994 - 1997 $260 K
* A Seamless Env. for Productivity, PI/Co-PI, NSF and Motorola, 1994-1995 $85 K
* Early and Noninvasive Detection of Atherosclerosis, Vasocor, 1991-1993 $750 K
* Character Recognition with Neural Networks (PI: Pandya), IBM, 1990-92 $86 K
* Layout Topology Optimization for DCVS Logic (Co-PI: Barrett), IBM, 1990-91 $77 K
* Wafer Scale Integration for Image Perception, DARPA/SUS, 1989-1990 $78 K
* VLSI Implementation issues for neural networks, FHTIC, 1989-1992 $109 K
* Early Detection of Atherosclerosis, FAU, 1989-1990 $27 K
* Patterned Functional Electrical Stimulation for Hemiplegics, FHTIC, 1989-1990 $35 K
* Design of Analog VLSI Cell Library, USF, Tampa, 1986-1988 $40 K
* VLSI Design of Communication Systems (Co-PI: Szabo), APTEK, 1986-1987 $75 K
* Early Noninvasive Detection of Atherosclerosis, FHTIC, 1985-1987 $133 K
* Distributed Computing and VLSI Design (Co-PI: Raskin), IBM 1984-1986 $125 K

**Synergistic (and Large Team) Activities:**

* [**Consortium for Smart Phone, Mobile and Web Applications (CUSP) (2011 to Present):**](http://faculty.eng.fau.edu/shankar/vision/)Multi-disciplinary efforts that combines my various backgrounds in biomedical, electrical, computer engineering, computer science, innovation, and management. Multi-college joint courses have evolved on smart phones, robotics and the semantic web. These span high school to graduate school, across a number of colleges. This has facilitated communication across colleges which can be leveraged to evolve a university infrastructure of research enhancement, social entrepreneurism and STEM.
* [**Android Smart Phone Apps**](http://faculty.eng.fau.edu/shankar/research/smart-phone-apps/) **(2009- Present):** SBA funded us in 2009 to develop courses on Android Mobile phone App development. Since then, we have offered courses for high school to graduate level and beyond, and have involved students and faculty members from arts, anthropology, and engineering to develop marketable Apps. During the last year, we expanded the course to include business students in a face-to-face course; and later offered it as an eLearning course. Our [Android site](http://android.fau.edu/) is well visited by developers around the world (220 K visits).
* [**Multi-Disciplinary Engineering Collaborations**](http://csi.fau.edu/) **(2003-2008):** I led groups of 20+ computer science, computer and electrical engineering faculty members and students on a major 6 year Motorola project on radically increasing engineering design productivity. The group changed year-to-year with new goals. This was entitled “One Pass to Production” (OPP)
* **Industry Research and Development (2001-2002):** I worked as a senior consultant and technical account manager at Cadence supporting all system and chip design activities at Motorola. This allowed me to meet engineers and managers in all the disciplines and understand their design and product development flow. Citations of the OPP publication are at the [CSI site](http://csi.fau.edu/?page_id=5).
* **Technology Transfer (1991-2001):** My biomed patents resulting from pilot studies on human and monkey subjects were licensed to Vasocor Inc. I led a 30+ technical group (5/92-5/93) in developing Vasogram I. Vasogram II was used in a multi-center clinical validation study. (Herrington et al., [Circulation](http://www.ncbi.nlm.nih.gov/pubmed/15262851), 2004). My noninvasive measure for atherosclerosis was successfully correlated with abdominal aortic measurements with MRI.

**Professional Recognition:**

* Panel Member, Education Alternatives for Combining Engineering and Management, IEMC, Newfoundland, CA, September 2005
* Outstanding Faculty Award, Annual Award, College of Engineering, FAU, December 2003.
* Plaque of Appreciation, for leadership in implementing ‘One Pass to Production’ and ‘Digital Six Sigma’ programs, Motorola’s iDEN Cell Phone Division, September 2003.
* Leadership award, for leading the department in establishing collaborative relationship with Motorola, CSE Dept., FAU, March 2003.
* Panel Member, Education Alternatives in Biomedical Eng., Biocomplexity Conf., Dartmouth, 2002
* Team of the Year award, to our Motorola Enterprise Team at Cadence Design Systems, 2002.

**Other Information**

**Research Commercialization:** FAU's first licensing contract based upon my research on early and non-invasive detection of atherosclerosis, signed March 1991. Royalty payments of $1 Million have been received by the FAU Research Corporation through 2004.

**Continuing Education:**

* Certification of Achievement. Web 2.20 Tools You can Use to Improve Learning, The Sloan Consortium, December 2012.
* eLearning Designer/Facilitator Certification at FAU, passed with honors, May 2012
* CITI (Collaborative Institutional Training Initiative) Certification obtained for both Biomedical Research Investigators and Social & Behavioral Research investigators, September 2011
* NIH, UMLS (Unified Medical Language System) One-day Training, Fall 2007
* Rhapsody, UML Tool for Real-Time, Motorola Funding, FAU, April 2004
* NSF Sponsored Workshop on Biocomplexity, at Dartmouth College, Hanover, NH, July 2002.
* Leadership Training, Three-day course, The Client Partner, Aspen Consulting Inc., April 2002.
* Senior Consultant at Cadence, with focus in the complex and challenging area of SFV (Systems and Functional Verification), during January 2001 to July 2002.
* Active support of Cadence tools and design flow, during January 2001 – 2003 at Motorola.
* Design experience with UML, MLD, SystemC, Verilog, SPW, Cascade, Analogy, PSPICE, HSPICE, Matlab, HP Tester, Xilinx, and several microcontrollers
* Executive MBA – to enhance and expand our college wide center and our product engineering consortium (comprised of centers at four universities).

**Collaborators and Other Affiliations:**

* Industrial: Jaime Borras, ex-VP and CTO, iDEN, Motorola, Plantation, FL, now President, MTC (mobile Technology Consortium), FL; Jerry Merckel, ex-Senior Manager, IBM, Boca Raton, FL.
* Academic: Fran McAfee, Michael Harris, and Don Ploger, Faculty members at FAU
* Biomedical: John G Webster, Professor Emeritus, University of Wisconsin, Madison, WI, and M. G. Bond, Professor Emeritus, Bowman Gray School of Medicine, Winston-Salem, NC