

# Navid Amini

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## EDUCATION

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- 09/2007 - 06/2012**      **Ph.D. in Computer Science, UCLA**  
Advisor: Prof. Majid Sarrafzadeh  
Thesis Title: "Transmission Power Management for Wireless Health Applications"
- 09/2007 - 03/2010**      **M.Sc. in Computer Science, UCLA**  
Advisor: Prof. Majid Sarrafzadeh  
GPA: 4.0
- 09/2002 - 06/2007**      **B.Sc. in Computer Engineering, Sharif University of Technology**  
GPA: 3.8 graduated with high honor

## RESEARCH INTERESTS

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### Wireless Health (Theory and Practice):

- Ubiquitous computing for healthcare
  - Decentralized and proactive health monitoring
  - On/off-body radio channel characterization and modeling
- Medical embedded system design
  - Low power sensing and telemetry for 24/7 monitoring
  - Intelligent and adaptive sensing
- Collaborative signal and information processing
  - Leveraging data mining and artificial intelligence methods for biomedical applications
  - Fusion of multiple physiological signals

## RESEARCH AND WORK EXPERIENCE

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- 05/2005 - 05/2007**      **Dependable Systems Laboratory (DSL) – Sharif University of Technology**      Tehran, Iran  
Undergraduate Research Assistant
- Working on low power digital design techniques in different levels of abstraction
  - Study on communication protocols for wireless sensor networks
- 09/2007 – Present**      **Wireless Health Institute (WHI) – UCLA**      Los Angeles, CA  
**Embedded and Reconfigurable Systems Lab (ER Lab) – UCLA**  
Graduate Student Researcher
- Design and development of various wireless health-monitoring systems
    - Personalized ultraviolet monitoring
    - A home automation system for childhood obesity prevention (No-Pain-No-Game)
    - Quantitative measurement of neuro-motor disorders
    - Smart Shoes/Insoles for plantar pressure monitoring and gait analysis

- Algorithms design for health-monitoring systems
  - Unsupervised activity discovery
  - Transmission power control
  - Automatic on-body sensor localization
  - Power-aware feature selection

**07/2008 –  
09/2008**

**Applied Laser Technology, Inc**

Beaverton, OR

Summer Intern

- Designing an electronic module for multi-axis motion control

**06/2009 –  
09/2009  
06/2010 –  
09/2010**

**MediSens Wireless**

Los Angeles, CA

Summer Intern

- Designing a context-aware smart insole (PACE™) for
  - Gait assessment and instability analysis
  - Research and rehabilitation
- Rehabilitative sensor-instrumented hand grip (CMAS™)
  - Determining fine motor movements
  - Quantifying muscle's maximum strength
  - Improving hand-eye coordination
  - Keeping track of patient's progress
- Smart textile (eTextile™)
  - A bed sheet for sleeping posture monitoring and analysis
  - Deriving pressure distribution of subjects
  - Different calibration and classification algorithms

## TEACHING EXPERIENCE

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**09/2005 –  
02/2007**

**Department of Computer Engineering – Sharif University of Technology**

Tehran, Iran

Teaching Assistant

- “Signals and Systems” course, Fall 2005
- “Signals and Systems” course, Spring 2006
- “Signals and Systems” course, Fall 2006
- “Computer Organization” course, Fall 2005
- “Computer Organization” course, Fall 2006
- “Microprocessors” course, Spring 2006
- “Linear Control Systems” course, Spring 2006
- “Electrical Circuits” course, Fall 2006

**09/2007 –  
06/2010**

**Computer Science Department – UCLA**

Los Angeles, CA

Instructor / Teaching Associate

- “Digital Design Laboratory” course, Fall 2007
- “Digital Design Laboratory” course, Winter 2008
- “Digital Design Laboratory” course, Spring 2008
- “Digital Design Laboratory” course, Fall 2008
- “Advanced Digital Design Laboratory” course, Winter 2009
- “Digital Design Laboratory” course, Spring 2009 (Head Teaching Associate)

- “Advanced Digital Design Laboratory” course, Fall 2009
- “Digital Design Laboratory” course, Winter 2010 (Head Teacher Associate)
- “Digital Design Laboratory” course, Spring 2010 (Head Teacher Associate)
- “Digital Design Laboratory” course, Fall 2010
- “Digital Design Laboratory” course, Spring 2011 (Head Teacher Associate)
- “Digital Design Laboratory” course, Fall 2011 (Head Teaching Fellow)

## PUBLICATIONS

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### Journals and Magazines:

- N. Amini, M. Sarrafzadeh, A. Vahdatpour, W. Xu, “Accelerometer-based on-body sensor localization for health and medical monitoring applications,” *Pervasive and Mobile Computing Journal – Elsevier*, Vol. 7, Issue 6, December 2011, pp. 746-760.
- N. Amini, A. Vahdatpour, F. Dabiri, H. Noshadi, M. Sarrafzadeh, “Joint Consideration of Energy-Efficiency and Coverage-Preservation in Microsensor Networks,” *Wireless Communications and Mobile Computing Journal*, Vol. 11, Issue 6, June 2011, pp. 707-722.
- N. Amini, M. Sarrafzadeh, “A Wireless Home Automation System for Childhood Obesity Prevention,” *Bruin innovation & Technology Magazine*, pp. 24-33 **[Outstanding project award]**.
- N. Amini, A. Vahdatpour, W. Xu, M. Sarrafzadeh, “Cluster Size Optimization in Sensor Networks with Decentralized Cluster-Based Protocols,” *Computer Communications Journal – Elsevier*, Volume 35, Issue 2, Jan. 2012, pp. 207-220.
- H. Noshadi, S. Ahmadian, H. Hagopian, J. Woodbridge, F. Dabiri, N. Amini, M. Sarrafzadeh, N. Terrafranca, “HERMES: Mobile System for Instability Analysis and Balance Assessment,” *In Press, ACM Transactions in Embedded Computing Systems (TECS)*.
- [PENDING] W. Xu, F. Gong, N. Amini, “Large Girth Low-Density Parity-Check Codes and Their Improvement Using Kronecker Product,” *Under second review, International Journal of Communication Systems*.

### Conferences:

- [PENDING] H. Ghassemzadeh, N. Amini, M. Sarrafzadeh, “Power-Aware Feature Extraction in Wearable Cyber Physical Systems,” *Submitted to 49th Annual Design Automation Conference (DAC 2012)*.
- N. Amini, W. Xu, M. Sarrafzadeh, “Experimental Analysis of RF Transmission Characteristics for On/Off body communications,” in *Proc. of the 22<sup>nd</sup> IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Sept. 2011, Toronto, Canada.
- A. Vahdatpour, N. Amini, M. Sarrafzadeh, “On-body Device Localization for Health and Medical Monitoring Applications,” in *Proc. of the IEEE Pervasive Computing and Communication conference (PerCom 2011)*, Seattle, Washington, pp. 33-39.
- N. Amini, M-C. Hsiao, M. Sarrafzadeh, “A Wireless Home Automation System for Childhood Obesity Prevention,” *Proc. of the International Conference on Biomedical Electronics and Devices (BIODEVICES 2010)*, Valencia, Spain, Jan. 2010, pp. 75-81.
- A. Vahdatpour, N. Amini, M. Sarrafzadeh, “Toward Unsupervised Activity Discovery Using Multi Dimensional Motif Detection in Time Series,” *Proc. of the Twenty-first International Joint Conference on Artificial Intelligence (IJCAI) 2009*, Pasadena, California, pp. 1261-1266.
- N. Amini, J. E. Matthews, A. Vahdatpour, M. Sarrafzadeh, “The Design of a Wireless Portable Device for Personalized Ultraviolet Monitoring,” *Proc. of 2009 SPIE Nanoscience and Engineering Conference*, San Diego, CA, USA, pp. 739700-739700-12.
- N. Amini, J. Matthews, F. Dabiri, A. Vahdatpour, H. Noshadi, M. Sarrafzadeh, “A Wireless Embedded Device for Personalized Ultraviolet Monitoring,” *Proc. of the International Conference on Biomedical Electronics and Devices (BIODEVICES 2009)*, Porto, Portugal, Jan. 2009, pp. 200-205.
- W. Xu, Z. Li, M. C. Huang, N. Amini, M. Sarrafzadeh, “eCushion: An eTextile Device for Sitting Posture Monitoring,” *to appear in Proc. of the 8th International Conference on Body Sensor Networks (BSN 2011)*, Dallas, Tx, May 2011, pp. 194-199.

- H. Noshadi, N. Amini, J. Woodbridge, W. Xu, M. Lan, H. Hagopian, N. Terrafranca and M. Sarrafzadeh, "Lightweight Context-Aware Smart Insole for Gait Analysis, Research and Rehabilitation," *Parkinsonism & Related Disorders*, Vol. 16, Supp. 1, Feb. 2010, pp. S29.
- H. Noshadi, S. Ahmadian, H. Hagopian, J. Woodbridge, F. Dabiri, N. Amini, M. Sarrafzadeh, N. Terrafranca, "HERMES - Mobile Balance and Instability Assessment System," *Proc. of the International Conference on Bio-inspired Systems and Signal Processing (BIOSIGNALS 2010)*, Valencia, Spain, Jan. 2010, pp. 264-270.
- F. Dabiri, N. Amini, M. Rofouei and M. Sarrafzadeh, "Reliability-Aware Optimization for DVS-Enabled Real-Time Embedded Systems," *Proc. of 9th International Symposium on Quality Electronic Design, (ISQED)*, San Jose, CA, USA, March 2008, pp. 780-783.
- N. Amini, M. Rofouei, W. J. Kaiser, M. Sarrafzadeh, "Energy-Aware Heart Rate Monitoring During Stair Climbing," *Proc. of 2008 UC Bioengineering Symposium*, Riverside, CA, USA, June 2008, pp. 125.
- N. Amini, M. Fazeli, S. G. Miremadi, M. T. Manzuri, "Distance-Based Segmentation: An Energy-Efficient Clustering Hierarchy for Wireless Microsensor Networks," *Proc. of the 5th Annual Conference on Communication Networks and Services Research*, Fredericton, Canada, May 2007, pp. 18-25.
- N. Amini, S. G. Miremadi, M. Fazeli, "A Hierarchical Routing Protocol for Energy Load Balancing in Wireless Sensor Networks", *Proc. of 20th IEEE Annual Canadian Conference on Electrical and Computer Engineering*, Vancouver, Canada, Apr. 2007, pp. 1086-1089.

## **PATENTS, COMMERCIALIZATIONS, AND CLINICAL TRIALS**

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- "Exercise Based Entertainment Controller", Provisional Patent, Navid Amini, Majid Sarrafzadeh, UCLA Case No. 2009-496, Serial Number 61/467,744.
  - NPNG™- No Pain No Game™
  - Recently licensed to a strategic investor
  - Reported by the news page of the China Pinetree company
- "Method of Assessing Human Fall Risk Using Mobile Systems", Issued Patent, Majid Sarrafzadeh, Nicholas A. Terrafranca JR., Hyduke Noshadi, Shaun Ahmadian, Hagop Hagopian, Jonathan Woodbridge, Navid Amini, Wenyao Xu, Mars Lan, UCLA Case No. 2009-383-2, Serial Number 61/222,900, International Patent Application Serial Number, PCT/US2010/40431.
  - PACE™- Clinical Gait Assessment System™ - Trademark of MediSens Wireless
  - Granted FDA approval to start clinical trials in Spring 2012
  - Reported by **LA Times** and **Chicago Tribune** in January 2010
- Development of a clinical handgrip device to evaluate the progress of ongoing muscle and neuromotor functions.
  - CMAS™- Clinical Movement Assessment System – Trademark of MediSens Wireless
  - Targets rehabilitation of patients with stroke and carpal tunnel
  - Clinical trials performed at the Saint Vincent Medical Center
  - Next phase at three hospitals in California in partnership with RehabCare Group
- Developing a smart bed sheet prototype with target applications to monitor patients at the risk of developing pressure ulcers.
  - Execution of phase 1 is on schedule for the next 18 months
  - MediSens Wireless has recently secured \$1.5M of new funds for phase 1

## **PRESENTATIONS, INVITED TALKS, AND TUTORIALS**

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- "Energy-Aware Heart Rate Monitoring", Poster Presentation, UC Bioengineering Symposium, Riverside, Jun. 2008.
- "SmartShoe: Long-Term Instability and Fall Risk Detection", Poster Presentation, UCLA Wireless Health Institute, UCLA, Los Angeles, Nov. 2008.

- “SoftSystems Embedded Computing Program”, Special Meeting with Charles Bergan: Qualcomm VP of Corporate Software R&D, Electrical Engineering Department, UCLA, Oct. 2008. “
- “Instrumented Insole”, MediSens Wireless Technical Update, California NanoSystems Institute, June. 2009.
- “The Design of a Wireless Portable Device for Personalized Ultraviolet Monitoring,” SPIE Biosensing Conference, San Diego, CA, Aug. 2009.
- “Toward Healthy and Preventive Lifestyles: Case Example on a Home Automation System for Childhood Obesity Prevention”, Invited lecture, Wireless Health Class, UCLA, Apr. 2010.
- “Wireless Health Information and Hardware Technology and Systems,” SPIE Biosensing Conference, San Diego, CA, Aug. 2010.
- “Precision versus Accuracy and Repeatability versus Reproducibility in Medical Monitoring Systems,” Invited lecture, Wireless Health Class, UCLA, Apr. 2011.
- “Gaming for Upper Extremities Rehabilitation,” ACM/EMBS Conference on Wireless Health (WH), San Diego, CA, Oct., 2011.

## HONORS AND AWARDS

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**Best Demo Award** – Wireless Health Conference in San Diego, Oct. 2011

**Symantec Outstanding Graduate Student Research Award**, May 2011

**Outstanding Project Award** – Bruin innovation & Technology Magazine (BIT), April 2011

**UCLA – Outstanding Graduate Teaching Associate** – Computer Science Department, Fall 2009

**UCLA – Nonresident Tuition Grant** for 2007-2008, 2008-2009, 2009-2010, 2010-2011, 2011-2012

**UCLA – University Fellowship** for 2007-2008

**University of California, Santa Barbara** – Nominated for Graduate Fellowship

**Travel Award** – The 5th Annual Conference on Communication Networks and Services Research

**Sharif University of Technology** – Ranked 1<sup>st</sup> in class in the last two years GPA

**Iran’s National University Entrance Exam** – Ranked in the top 1% among all accepted participants in Iran’s national university entrance exam (Konkoor)

## DESIGNED COURSES

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- **Digital Design Laboratory course** **UCLA CS152A**
  - Full responsibility for the course redesign and teaching
  - Hands-on laboratory projects on fundamentals of digital electronics
  - Introduction to HDLs and FPGAs
- **Advanced Digital Design Laboratory course** **UCLA CS152B**
  - Hardware selection, literature selection, supplemental lectures
  - Capstone course for computer engineering seniors
  - Real world problems with focus on healthcare industry
  - Solutions implemented on FPGA boards
- **Directed Research course** **UCLA CS199**
  - Undergraduate directed research course
  - Project design for three undergraduate students

- **M.Sc. Project Seminar course** **UCLA EE299**
  - The project component of the master's degree
  - Mentoring two master's student
  
- **Introduction to Engineering Disciplines course** **UCLA E87**
  - Project design for three freshmen
  - Teaching principles of wireless communications

## **PROFESSIONAL ACTIVITIES**

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### **Reviewer:**

#### **Proposals:**

- Qatar National Research Fund (QNRF)

#### **Journals:**

- International Journal of Communication Systems (IJSC)
- Wireless Communications and Mobile Computing (WCMC)
- ACM Transactions in Embedded Computing Systems (TECS)
- Springer Journal, Real-Time Systems (RTS)
- Wireless Networks – Springer (WINET)
- International Journal of Automation and Computing (IJAC)
- IEEE Transactions on Information Technology in Biomedicine (TITB)

#### **Conferences:**

- Wireless Health 2010 Conference (WH 2010)
- First ACM International Health Informatics Symposium (IHI 2010)
- International Conference on Body Sensor Networks (BSN 2010, BSN 2011))
- IEEE Wireless Communications and Networking Conference (WCNC 2010)
- International Conference on Body Area Networks (BodyNets 2009 and BodyNets 2010)
- Second International Conference on Pervasive Computing Technologies for Healthcare (PCT Healthcare 2008)
- IEEE Symposium on Computers and Communications (ISCC 2007)
- IEEE/ACM Annual Conference on Communication Networks and Services Research (CNSR 2007)

### **Research Advisor:**

- UCLA Center for Excellence in Engineering and Diversity (CEED)

### **Professional Membership:**

- Student Member of the **SPIE**, **IEEE**, and **ACM**
- UCLA Office of Intellectual Property (OIP)
- California NanoSystems Institute (CNSI)

## REFERENCES

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### **Majid Sarrafzadeh**

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Wireless Health Institute  
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### **Mario Gerla**

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### **Kouros Nouri-Mahdavi**

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### **Hooman Mohseni**

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### **Ankur Srivastava**

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### **Behrooz Yadegar**

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Medisens Wireless Inc.  
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### **Nicholas Terrafranca**

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### **Miodrag Potkonjak**

Professor  
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### **Elie Antoun**

Chief Executive Officer  
AccelOps Inc.  
Web: <http://www.Accelops.com/>  
E-mail: [elie\\_antoun@yahoo.com](mailto:elie_antoun@yahoo.com)  
Phone: (408) 839-1471

### **Soheila Mirhashemi**

Chief Executive Officer  
Neomedix, Inc.  
Web: [www.neomedix.net/](http://www.neomedix.net/)  
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### **Ali Aminlari**

Professor  
Pennsylvania State University  
Penn State Hershey Medical Center  
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Phone: (717) 531-5690