

# Mario E. Bergés

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## Education

- 2007-PRESENT Ph.D. in Civil and Environmental Engineering  
Carnegie Mellon University. Pittsburgh, PA USA  
Thesis topic: Enabling Energy-Aware Smart Facilities  
Advisors: Dr. Lucio Soibelman, Dr. H. Scott Matthews  
Expected Graduation Date: August/2010
- 2006-2007 M.S. in Civil and Environmental Engineering  
Carnegie Mellon University. Pittsburgh, PA USA  
Concentration: Advanced Infrastructure Systems  
GPA: 3.96/4.00
- 2004-2005 Graduate Certificate in Construction Management  
Instituto Tecnológico de Santo Domingo (INTEC), Dominican Republic  
GPA: 3.25/4.00
- 2001-2004 B.S. in Civil Engineering  
Instituto Tecnológico de Santo Domingo (INTEC), Dominican Republic  
GPA: 3.76/4.00 (Summa Cum Laude)

## Honors and Awards

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|------------|---|-------------|
| CARNEGIE   | Carnegie Institute of Technology Dean's Fellowship      | (2007-2008) |
| MELLON     | Paul P. Christiano Distinguished Service Award          | (2008)      |
| UNIVERSITY | Steven Fenves Conference Travel Grant                   | (2009)      |
|            | Graduate Student Assembly Conference Travel Grant       | (2009)      |
| INTEC      | The PIES National Scholarship for Undergraduate Studies | (2001-2004) |
| SOCIETIES  | Phi Kappa Phi Honor Society                             | (2008)      |
|            | Chi Epsilon Honor Society of Civil Engineers            | (2009)      |

## Professional Experience

### RESEARCH

#### **Enabling Energy-Aware Smart Facilities**

*Research Assistant*

(2007 - Present)

Funding Agencies: Bosch Research and Technology Center, National Science Foundation (NSF)

- Developed signal processing and machine learning algorithms for automatically disaggregating the total electricity consumption of a residential building into the individual appliances.
- Applied multi-variate time-series analysis techniques: change detection, eigen-analysis, cross-correlation, kernel regression, etc.
- Developed data-fusion strategies to leverage non-electricity sensors.
- Designed, implemented and deployed three prototype systems.
- Lead the writing of the research proposals.
- Helped manage and supervise the research team.
- Assisted in the application for a provisional patent.

#### **Sensor Andrew**

<http://sensor.andrew.cmu.edu/>

*Research Assistant and Network Manager*

(2007 - 2009)

Funding Agency: Pennsylvania Infrastructure Technology Alliance

- Assisted in managing a team of 10+ faculty and their students, to ensure individual projects were targeting the same goal.
- Assisted in developing the core infrastructure by: deploying sensors, developing software, designing the network architecture, etc.

#### **Power and Environmental Monitoring System for a Building**

*Research Assistant*

(2007)

Funding Agency: Pennsylvania Infrastructure Technology Alliance

- Helped to design, implement and deploy a monitoring system for measuring the power consumption of two separate wings (~4,700 sq. feet) of an academic building.
- Reverse-engineered communication protocols for legacy sensing devices.

### INDUSTRY

#### **Ruredil Dominicana, S. A.**

Dominican Republic

*Assistant Engineer*

(May 2005 - June 2006)

- Analyzed and designed fiber reinforced slabs on grade for various projects.
- Inspected and coordinated the installation of admixture dispensers on concrete ready-mix plants.

#### **Empresas Mayo, S. A.**

Dominican Republic

*Information Technology Assistant*

(August 1998 - November 2004)

- Developed accounting applications in Visual Basic.
- Advised the personnel on information technology matters.

## Publications

- JOURNALS
- Berges, Mario, Ethan Goldman, H. Scott Matthews, Lucio Soibelman. “Enhancing Electricity Audits in Residential Buildings with Non-Intrusive Load Monitoring”. *Journal of Industrial Ecology: Special Issue on Environmental Applications of Information and Communication Technologies (ICT)*. (Submitted in 2009. Under review).
- Rowe, Anthony, Mario Berges, Gaurav Bhatia, Ethan Goldman, Raj Rajkumar, Lucio Soibelman, James H. Garrett, José M. F. Moura. “Sensor Andrew: Large-Scale Campus-Wide Sensing and Actuation.” *IBM Journal of Research and Development: Special Issue on Smarter Cities and Sensed Infrastructures*. (Abstract Accepted in 2009).
- Berges, Mario, Ethan Goldman, H. Scott Matthews, and Lucio Soibelman. “Training Load Monitoring Algorithms on Highly Sub-Metered Home Electricity Consumption Data.” *Tsinghua Science & Technology* 13 (2008): 406-411. (Invited Journal Paper)
- CONFERENCES  
AND  
WORKSHOPS
- Berges, Mario, Lucio Soibelman, H. Scott Matthews. “Leveraging Data From Environmental Sensors to Enhance Electrical Load Disaggregation Algorithms”. *13th International Conference on Computing in Civil and Building Engineering*, Nottingham, UK, 2010. (Submitted)
- Berges, Mario, Lucio Soibelman, H. Scott Matthews. “Building Commissioning as an Opportunity for Training Non-Intrusive Load Monitoring Algorithms”, *16th International Conference on Innovation in Architecture, Engineering and Construction (AEC)*, State College, PA, 2010. (Submitted)
- Berges, Mario, Lucio Soibelman, H. Scott Matthews, Ethan Goldman. “Evaluating the electric consumption of residential buildings: current practices and future prospects”. *Construction Research Congress 2010*, Banff, Alberta, 2010. (Submitted)
- Berges, Mario, Ethan Goldman, H. Scott Matthews, and Lucio Soibelman. “Learning Systems for Electric Consumption of Buildings”. *ASCE International Workshop on Computing in Civil Engineering*, Austin, Texas, 2009.
- Rowe, Anthony, Mario Berges, Gaurav Bhatia, Ethan Goldman, Raj Rajkumar, Lucio Soibelman. “Sensor Andrew: Large-Scale Campus-Wide Sensing”. *8th ACM/IEEE International Conference on Information Processing in Sensor Networks*, San Francisco. 2009. (Demonstration Paper)

Berges, Mario, Ethan Goldman, H. Scott Matthews, and Lucio Soibelman. "Training Load Monitoring Algorithms on Highly Sub-Metered Home Electricity Consumption Data." *12th International Conference on Computing in Civil and Building Engineering*, Beijing, 2008.

Matthews, H. Scott, Lucio Soibelman, Mario Berges, and Ethan Goldman. "Automatically Disaggregating the Total Electrical Load in Residential Buildings: a Profile of the Required Solution." In *Intelligent Computing in Engineering (ICE08) Proceedings*. Plymouth, 2008.

TECHNICAL REPORTS Rowe, Anthony, Mario Berges, Gaurav Bhatia, Ethan Goldman, Raj Rajkumar, Lucio Soibelman, James Garrett, José M. F. Moura, "Sensor Andrew: Large-Scale Campus-Wide Sensing and Actuation," *Carnegie Mellon Technical Report*, ECE-TR-08-11 2008.

PATENTS Berges, Mario E., Ethan J. Goldman, Lucio Soibelman, Burton W. Andrews, Diego S. Benitez, H. Scott Matthews, Michael Hoyneck. "Methods and Apparatuses for Monitoring Energy Consumption and Related Operations". U.S. Provisional Patent #61/222,247. November 2009.

## Presentations

INVITED TALKS "SensorAndrew: A virtual instrument for large-scale sensing and actuation that enables sensor-based decision support for built infrastructure" in *IBM Research Center's Green Planet Seminar Series, Yorktown, NY*, 2009. (Along with Dr. James H. Garrett).

"Sensor Andrew: A Living Laboratory for Infrastructure Sensing Technologies" in *Annual Symposium of the Center for Sensed Critical Infrastructure Research (CenSCIR)*, Pittsburgh, PA, 2009. (Along with Anthony Rowe and Dr. James H. Garrett).

CONFERENCES "A Real-World Evaluation of NILM: Tradeoffs Between Data Collection and Information Effectiveness" in *5th Annual Carnegie Mellon Conference on the Electricity Industry: Smart Grids*, Pittsburgh, PA, 2009.

"Recognizing Appliance-specific Patterns in Multivariate Time Series of Power-metrics from a Building" in *2009 INFORMS Annual Meeting*, San Diego, CA, 2009.

POSTER SESSIONS "Automated Load Classification" in *Annual Symposium Center for Sensed Critical Infrastructure Research (CenSCIR)*, Pittsburgh, PA, 2008.

"Data Fusion and Integration from Multiple Sensor-Platforms using IBM's System-S" in *Annual Symposium of the Center for Sensed Critical Infras-*

*structure Research (CenSCIR)*, Pittsburgh, PA, 2008.

“Automatically Disaggregating the Total Electrical Load in Residential Buildings: A Profile of the Required Solution” in *ASCE Construction Research Council (CRC) 1st Annual Leadership Forum*, Chicago, IL, 2008.

“Detailed Electricity Consumption Monitoring” in *Annual Symposium of the Center for Sensed Critical Infrastructure Research (CenSCIR)*, Pittsburgh, PA, 2007.

## Teaching Experience

INSTRUCTOR	Special Topics: Concepts and Principles in Civil and Environmental Engineering (12-052). Carnegie Mellon University.	Summer 2008
	Microsoft Excel for Advanced Users. Private lectures. Dominican Republic.	Summer 2006
	Introduction to Computers. Private lectures for a company (Empresas Mayo, S.A.). Dominican Republic.	Summer 2004
TEACHING ASSISTANT	Engineering Economics (12-411). Carnegie Mellon University.	Fall 2009
	AutoCAD (12-600). Carnegie Mellon University.	Fall 2009
	Data Acquisition (12-740). Carnegie Mellon University.	Fall 2008
	Data Management (12-741). Carnegie Mellon University.	Fall 2008
	Data Acquisition (12-740). Carnegie Mellon University.	Fall 2007
	Data Management (12-741). Carnegie Mellon University.	Fall 2007

## Leadership Activities and Broader Impact

CARNEGIE MELLON UNIVERSITY	Instructor for the Advanced Placement/Early Action (AE/PA) summer program for high school students	(Summer 2008)
	Graduate Student Assembly Representative	(Fall 2007 - Present)
	University Student Affairs Council Member	(2008)
	University Education Council Member	(2009 - Present)
	CEE Annual Talent Show Committee Member	(2009, 2010)
	Graduate Student Advisory Committee Member, Department of Civil and Environmental Engineering	(Fall 2007, Fall 2009 - Present)
OTHER	Assistant for the organization of the ASCE Construction Research Council (CRC) 1st Annual Leadership Forum	(Summer 2007)
	Representative for the Dominican Republic at the Presidential Classroom program in Washington, D.C.	(Spring 2001)

## Affiliations

MEMBER	American Society of Civil Engineers (ASCE)	(2004 - Present)
	American Concrete Institute (ACI)	(2005 - Present)
	Institute for Complex Engineered Systems (ICES)	(2007 - Present)
	American MENSA	(2007 - Present)
	Phi Kappa Phi Honor Society	(2008 - Present)
	Chi Epsilon Honor Society of Civil Engineers	(2009 - Present)
	Institute of Electrical and Electronics Engineers (IEEE)	(2009 - Present)