# Gregory T. Ely


**Contact Information**

Gregory.Ely@Tufts.edu


**Education**

**Tufts University** **2010 - present**

Master of Science, Electrical Engineering.
Thesis: Sparse Seismic Hydraulic Fracture Monitoring.
Relevant Coursework: Inverse theory, detection and estimation theory, image processing, stochastic search & genetic algorithms, numerical linear algebra.

**Carleton College** **2004 - 2008**

Bachelor of Arts, *Magna cum Laude* with Distinction in Physics.
Received Distinction for Senior Thesis (The Physics of Traffic and Crowds. Advisor: Bill Titus)

**Fellowships & Funding**

**National Science Foundation** **2012 Awarded**
*Graduate Research Fellowship Program*
Passive Micro-Seismic Monitoring Using Sparsity in a Modified Radon Transform.

**Research Experience**

**Tufts University** **2010 May - Present**

*Research Assistant*
Electrical Engineering department, Shuchin Aeron, Advisor. Currently developing & testing algorithms that employ concepts from the field of compressive sensing and sparsity to detect and localize microseismic events in high noise environments. In particular, my research focuses on the detecting and estimating the location of hydraulic fractures with a spatially undersampled vertical array and the ability to monitor several fracturing regions with a single monitoring well.

**Schlumberger Doll Research** **2012 Summer**

*Intern*
Math & Modeling Department, Sandip Bose, Supervisor. Developed new algorithms for cement evaluation in boreholes using an ultrasonic transducer to image behind the borehole casing. Created a new technique that greatly improves the detection and characterization of the bond between cement and the rock formation.

**MIT Lincoln Laboratory** **2008 September - 2012 January**

*Researcher*
Tactical Defense Systems, Kevin Cohen, Supervisor. Developed a modular real time radar tracker in C++ to run on multiple ground based radar systems. Wrote and debugged real time imagery and data recording systems in C and C++. Developed MATLAB image processing and tracking tools to perform analyses of infrared imagery. Designed tests of infrared optical systems. Simulated and modeled the performance of optical systems, the atmosphere, and radiation of the viewed images.

**Carleton College** **2007 January - 2008 June**

*Research Assistant*
LIGO (Laser Interferometer Gravitational Wave Observatory) Scientific Collaboration, Nelson Christensen, Supervisor. Developed and debugged MATLAB programs which analyzed environmental sensor data in order to diagnose sources of continuous noise in gravitational wave detectors. Wrote and optimized code to run efficiently on distributed grid computers in order to assess the quality of analyzed sensor and interferometer data.

**Boston University** **2006 Summer**

*Research Assistant*

Research Assistant, Hearing Research Center, Department of Biomedical Engineering, Boston University. Steven Colburn, Director. Wrote and debugged code modules in C++ for EarLab, a program used to simulate components of the human auditory system. Developed a multi-platform Java graphical user interface to run EarLab simulations.

## Teaching Experience

**Carleton College**

*Teaching Assistant* **2007 - 2008 Academic year**

Teaching Assistant. Graded homework for Thermodynamics (Professor A. K. Pattanayak). Tutored for Relativity and Particles (Professor S. Parker).

*Rock Climbing Instructor* **2005 - 2008 Academic year**

Rock climbing instructor; Recreational Center, Carleton College. Supervised and instructed students in rock climbing.

## Skills

- Programming Languages: C++, Java, C, MATLAB, HTML ,UNIX shell scripting
- Computational Tools: Mathematica, MODTRAN (atmospheric transmission modeling), Condor grid computing, LaTeX, CVS, Subversion
- Foreign Language: Mandarin

## Conference Proceedings

(1)"Seismic Hydraulic Fracture Monitoring Using Simultaneous Sparse Penalization", Gregory Ely & Shuchin Aeron, 2012 July IEEE IGARSS Symposium, Munich, Germany (Accepted, March 2012)

## Journal Publications

(9) "Search for gravitational waves from binary black hole inspiral, merger and ringdown", B. J. Abadie *et al.* (LIGO Scientific Collaboration & Virgo Collaboration), Submitted to Phys. Rev. D March 2011

(8) "Search for Gravitational Waves from Compact Binary Coalescence in LIGO and Virgo Data from S5 and VSR1", B. J. Abadie *et al.* (LIGO Scientific Collaboration & Virgo Collaboration), Phys. Rev. D 82, 102001 (2010)

(7) "Search for gravitational waves from low mass compact binary coalescence in 186 days of LIGO's fifth science run", B. Abbott *et al.* (LIGO Scientific Collaboration), Phys. Rev. D 80 047101 (2009)

(6) "An upper limit on the stochastic gravitational-wave background of cosmological origin", B. Abbott *et al.* (LIGO Scientific Collaboration & Virgo Collaboration), Nature, Vol. 460, p. 990 (2009)

(5) "Einstein@Home search for periodic gravitational waves in early S5 LIGO data", B. Abbott *et al.* (LIGO Scientific Collaboration), Phys. Rev. D 80 042003 (2009)

(4) "Search for gravitational waves from low mass binary coalescences in the first year of LIGO's S5 data", B. Abbott *et al.* (LIGO Scientific Collaboration), Phys. Rev. D 79 122001 (2009)

(3) "All-Sky LIGO Search for Periodic Gravitational Waves in the Early Fifth-Science-Run Data", B. Abbott *et al.* (LIGO Scientific Collaboration), Physical Review Letters 102 111102 (2009)

(2) "Einstein@Home search for periodic gravitational waves in LIGO S4 data", B. Abbott *et al.* (LIGO Scientific Collaboration), Phys. Rev. D 79 022001 (2009)

(1) "The LSC glitch group: monitoring noise transients during the fifth LIGO science run", L. Blackburn, L. Cadonati, S. Caride, S. Caudill, S. Chatterji, N. Christensen, J. Dalrymple, S. Desai, A. Di Credico, **G. Ely**, J. Garofoli, L. Goggin, G. Gonzlez, R. Gouaty, C. Gray, A. Gretarsson,

D. Hoak, T. Isogai, E. Katsavounidis, J. Kissel, S. Klimenko, R. A. Mercer, S. Mohapatra, S. Mukherjee, F. Raab, K. Riles, P. Saulson, R. Schofield, P. Shawhan, J. Slutsky, J. R. Smith, R. Stone, C. Vorvick, M. Zanolin, N. Zotov and J. Zweizig. Classical and Quantum Gravity, Vol. 25, 184004 (2008)

PATENTS

"Scale Device for Measuring Flow Rate of Poured Liquids using a Kalman Filter"
Inventors: Andrew Coats, Benjamin Salinas, and Gregory Ely
Luminaire Coffee LLC, (Provisional Patent Accepted March 2012)