JOEL TENENBAUM

Campus
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Permanent
Boston, MA, 02135

- Over 12 years of teaching experience and strength in communicating and explaining abstract physical and mathematical concepts to both native English speakers and speakers of English as Second Language
- Experience in presentations, in white/blackboard, Powerpoint and Promethean (Smart) board formats, for audiences aged 13-35.
- Subject expertise in physics, statistics, mathematics, chemistry, and general science.
- Attentive to detail. Experience in independent learning.
- Avid reader, appreciation of language and writing
- Computing: C++, Python, LaTeX, Mathematica, Matlab, xmgrace, Linux, Mac OS, Windows
- Research: experience in publishing international collaborative research papers.

EDUCATION

Ph.D. Physics (Boston University, Boston, MA, Defended April 13, 2012)

M.A. Physics (Boston University, Boston, MA, March 2008)

B.A. Physics and Mathematics with music minor (Goucher Colllege, Balitmore, MD 2006)

3.82 GPA. (Physics: 3.92)

TEACHING EXPERIENCE

Teacher of Physics CATS Academy, Newton, MA 2013-present

- Taught conceptual, honors, and AP-level physics to approximately 60 high school students meeting 4 hours per week for each class.
- Planned curriculum and syllabus. Created exercises, homework sets, assessments, and laboratory assignments. Assigned grades.
- Used various interactive and participatory approaches and technology, including whiteboard, Promethean (Smart) board, and internet-based class submissions.
- Coached Math and Science Club. Oversaw students' competition in WPI Math Meet, AMC12, MAML competitions.
- Oversaw student participation in NetSci High program. Students met with a researcher once a week for guidance, conducted research, and presented their results at CompleNet 2015 network science conference in New York City and Cambridge Science Festival 2015 at Boston University.

Teaching Fellow, *Boston University*, Boston, MA 2013

- Lead discussion sections for approximately 100 students, coordinating with undergraduate courses in chemistry
- Explain concepts in chemistry using problem-based interactive discussions, based in the Socratic method
- Demonstrate solving problems in real-time on blackboard to emphasize and clarify high density information
- Provide weekly opportunities to meet individually with students for individualized tutoring

Lecturer, *Boston University School of Management*, Boston, MA 2012
- Taught statistics, including multiregression modeling and population sampling to students enrolled in the Boston University School of Management's MBA program
- Responsible for syllabus, coursework, assignments, and grades of approximately 100 MBA students of mixed international background
- Utilized creative motivating techniques to engage class and stimulate discussion

Mentor, *BUILD Greater Boston*, Boston, MA 2011-2012
- Taught entrepreneurial skills to inner-city high school freshmen in a mentorship capacity
- Engaged students in independent thinking exercises

Tutor*, Boston University Academy*, Boston, MA 2007-Present
- Directed preparatory school high school freshmen in analytic reasoning in mathematics, chemistry, and physics
- Guided students through strategies for analytic problem solving

Teaching Fellow, *Boston University*, Boston, MA 2006-Present
- Facilitated physics discussions of approximately 100 students per semester
- Guided student laboratory sections corresponding to coursework
- Demonstrated problem-solving strategies and abstract reasoning through use of blackboard, electronic media, and interactive discussion

Tutor and Supplemental Instructor, *Goucher College*, Towson, MD 2002-2006
- Facilitated supplemental class sessions for first year and second year physics
- Tutored through Academic Center for Excellence in both physics and mathematics

AWARDS

- NSF International Travel Award to participate in the IUPAP Triennial Conference on Statistical Physics, Cairns, Australia, July 2010
- Dean's List: 2002-2006
- National Dean's List: Fall 2004
- Marvin-Perry merit-based scholarship: 2002-2006
- Charter Member: Maryland Theta Chapter Pi Mu Epsilon Mathematics Society
- Inducted member: Phi Beta Kappa
- Julia Gontrum Hill Award in Music 2005 and 2006
- Alumnae/i Prize in Physics 2006

SCIENTIFIC PUBLICATIONS

1. "**Differential conductance of type II superconductors in high magnetic fields**." *NCUR Proceedings, April 2005.* With Sasha Dukan.

   Brief description: Computational work on superconductors, predicting experimental results from energy structure.

2. "**Asymmetry in power-law magnitude correlations.**" *Physical Review E: Rapid Communications,* **80,** July 17, 2009. With Boris Podobnik,* Davor Horvatic, and H. Eugene Stanley.

   Brief description: Modeling financial and physiological time series using dynamic volatility processes.

3. "**STM differential conductance of a disordered extreme type-II superconductor at high magnetic fields.**" *Physical Review B,* **82**, October 4, 2010. With Sasha Dukan,* Joe Porembski, and Karl Tata.

   Brief description: Follow-up to paper 1, further results on superconductor energy structure.

4. "**Comparison between response dynamics in transition and developed economies.**" *Phys. Rev. E,* **82**, October 8, 2010. With Davor Horvatic, Slavica Cosovic Bajic, Beco Pehlivanovic, Boris Podobnik, and H. Eugene Stanley.

   Brief description: Modeling international financial data using dynamic volatility processes across country and time period to make statements of comparison across countries.

5. "**Statistical Laws Governing Fluctuations in Word Use from Word Birth to Word Death**." *Nature: Scientific Reports,* **2**, March 15, 2012, With Alex. M. Petersen*, Shlomo Havlin, and H. Eugene Stanley.

   Brief description: Drawing statistical comparisons across disciplines to extract the fundamental universal principles and dynamics of word use selection across time.

News coverage:

   a. *Wall Street Journal:* ***"The New Science of the Birth and Death of Words "***
   b. *United Press International:* ***"Study tracks births, deaths of words"****, duplicated in:*
      i. *Outcome Magazine*
      ii. *e! Science News*
   c. *The Times of India:* ***"Digital spell-check blamed for killing words: Study"***
   d. *Science News:* ***"Modern era brings death to words"***
   e. *Innovation News Daily:* ***"Languages Lose Vocab to Science and Spell-Check"***
   f. *Mobiledia:* ***"Texting Kills Off Words, But Language Survives"***
   g. *Live Science:* ***"Digital Spell-Checking May Be Killing Off Words"****, duplicated in:*
      i. *Discovery News*
      ii. *msnbc.com*
      iii. *News Track India*

6. "**Earthquake networks based on similar activity patterns**." *Phys. Rev. E***, 86**, October 2012. With Shlomo Havlin and H. Eugene Stanley.

   Brief description: Using techniques from statistical network physics from explain and describe earthquake data

News coverage:

- *Technology Review:* ***Earthquakes, Networks, and the Tricky Topic of Quake Prediction***

7. "**Scaling of Seismic Memory with Earthquake Size**." *Phys. Rev. E*, **86**, July 2012. With Zeyu Zheng,* Kazuko Yamasaki, Boris Podobnik, and H. Eugene Stanley

   Brief description: Correlation and scaling analysis of earthquake signal and the impact of large proximal events.

8. "**Applications of Statistical Physics to Complex Systems: Seismic Physics, Econophysics, Sociophysics.**" Ph.D. thesis, Boston University. Defended April 13, 2012. Thesis advisor: H. Eugene Stanley

   Brief description: doctoral thesis.

9. **"Carbon dioxide emissions trading and hierarchical structure in worldwide finance and commodities markets"**. Phys. Rev. E, **87**, January 2013. With Zeyu Zheng*****, Kazuko Yamasai, and H. Eugene Stanley.

   Brief description: applying correlation analysis, minimal spanning trees, and Euclidean metrics to analyze relationships between currency futures, commodity futures, and world financial markets.

10. **"Languages cool as they expand: Allometric scaling and the decreasing need for new words"**. *Nature: Scientific Reports*, **2**, December 10, 2012.. With Alex M. Petersen*****, Matjaz Perc, Shlomo Havlin, and H. Eugene Stanley.

    Brief description: Follow-up to paper 5. Drawing statistical comparisons across disciplines to extract the fundamental universal principles and dynamics of word use selection across time.

News coverage:

a. *The Hindu: "**How big is your language?**"*
b. *Inside Science: "**Physicists Explore The Rise And Fall of Words**"*

** denotes first author.*

PRESENTATIONS

- "**Difference Conductance of Extreme Type-II Superconductors in High Magnetic Fields**"
  - *National Conference of Undergraduate Research* (NCUR), Lexington, VA. April, 2005.
  - *Posters on the Hill*, Council on Undergraduate Research. Washington, D.C., April, 2005
- "**Correlation Networks of Earthquakes**". *APS March Meeting 2009*, American Physical Society. Pittsburgh, PA, March 19, 2009.
- "**Correlation Networks of Earthquakes**". *International Workshop on Network Science 2009*. Venice, July 1, 2009
- "**Can Networks Help Understand Earthquake Physics?**" *International Conference on Statistical Physics of the International Union for Pure and Applied Physics (IUPAP) 2010*. Cairns, Australia, July 29, 2010.
- "**The Sign Effect in Emerging Markets: The Inherent Instability of Bad News**". *HES70: Horizons in Emergence & Scaling*. Poster session. Boston, March, 2011
- **"The Sign Effect in Emerging Markets: The Inherent Instability of Bad News**". *APS March Meeting 2011*, American Physical Society. Dallas, TX, March 21, 2011.
- "**The Growth Dynamics of Words: How Historical Context Shapes the Competitive Linguistic Environment**". *APS March Meeting 2012*, American Physical Society. Boston, Feb 28, 2012.
- "**Why Does a Virus Need a Choice? – Evolution of a Switch**". D. Kim, T Mirzoian, A. Plloci, J. Yoo, J. Tenenbaum, and E.R Regan. *Complenet 2015*, Queens, New York City.

- "**Why Does a Virus Need a Choice" – Evolution of a Switch**". *Cambridge Science Festival 2015*, Boston University, Boston.