



# IanGemp

PhD Candidate | UMass Amherst

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## Web Links

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## Programming

### Recent:

Python • Theano  
Tensorflow • MXNet

### Past 5 Years:

Matlab • Typescript  
Go • SQL • VBA

## Coursework

### Computer Science

Machine Learning  
Artificial Intelligence  
Graphical Models  
Deep Learning  
Interactive Learning  
Optimization  
Approx & Comb Opt  
Algorithms

### Applied Math (ODEs/PDEs)

Numerical, Analytical,  
Asymp. Perturbation  
Dynamical Systems  
Optimal Control

## Education

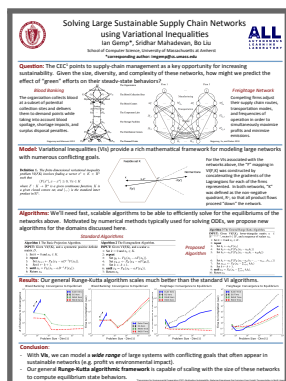
2013 - 2018	<b>PhD in Computer Science</b>	University of Massachusetts, Amherst MA
2013 - 2016	<b>MS in Computer Science</b>	University of Massachusetts, Amherst MA
2010 - 2011	<b>MS in Applied Mathematics</b>	Northwestern University, Evanston IL
2006 - 2010	<b>Dual BS in Applied Mathematics and Mechanical Engineering</b>	Northwestern University, Evanston IL

## Relevant Experience

09/13 - Now	<b>Research Assistant</b>	UMass CICS - Autonomous Learning Lab
Conduct research with <i>Professor Mahadevan</i> on optimization, equilibration, multi-agent learning, reinforcement learning, deep learning, and modeling.		
<ul style="list-style-type: none"> <li>Identify and characterize equilibria in non-monotone variational inequality games (with applicability to GANs). [Master's Thesis]</li> <li>Design a novel semi-supervised VAE for the unmixing of spectral data transmitted from the Curiosity rover and satellites on Mars. [NIPS AABI '17]</li> <li>Develop a learning model for context dependent cognition inspired by the path integral formulation of quantum mechanics.</li> </ul>		
05/18-08/18	<b>Applied Scientist Intern</b>	Amazon Web Services—AI Algorithms (Sagemaker)
Automate the discovery of user desired topics with advanced deep learning techniques. Mentored by Bing Xiang, Ramesh Nallapati, and Ran Ding.		
<ul style="list-style-type: none"> <li>Designed a semi-supervised Neural Topic Model (NTM) that can align to user desired topics given weak supervision.</li> </ul>		
09/17 - 12/17	<b>Teaching Instructor</b>	UMass Undergraduate Artificial Intelligence Course (CS383)
Teach 105 undergrads AI —Text: <i>Russell &amp; Norvig</i> .		
<ul style="list-style-type: none"> <li>Prepared 25 lectures with slides, 6 homeworks, 1 midterm, and 1 final exam.</li> <li>Instructed students twice weekly in 1 hr 15 min class + office hours.</li> <li>Delegated duties to 2 TA's and 2 undergraduate graders.</li> </ul>		
06/16-02/17	<b>PhD Data Scientist Intern</b>	Adobe Research (Big Data Experience Lab)
Automate data cleansing through meta-learning and metric learning under guidance of Georgios Theodorou and Mohammad Ghavamzadeh.		
<ul style="list-style-type: none"> <li>Designed a system that intelligently recommends effective data cleansing procedures for new machine learning tasks.</li> <li>Oral @ IAAI'17—"Automated Data Cleansing through Meta-Learning".</li> </ul>		
Spr 15 & 16	<b>Teaching Assistant</b>	UMass Graduate Machine Learning Course (CS589)
Assist <i>Professor Marlin</i> in teaching graduate level Machine Learning.		
<ul style="list-style-type: none"> <li>Prepared and graded assignments for regression, classification, and unsupervised tasks performed on UCI and other datasets.</li> <li>Assisted students in understanding course content and assignments during weekly office hours.</li> </ul>		
06/15 - 09/15	<b>Program Assistant</b>	UMass Research Experience for Undergrads (REU)
Facilitate the progress and development of 17 undergrads through a summer research training program in data science.		
<ul style="list-style-type: none"> <li>Helped teach standard data science practices for Data Science Bootcamp.</li> <li>Invited and scheduled speakers for weekly lunch seminars.</li> </ul>		

(09/14)

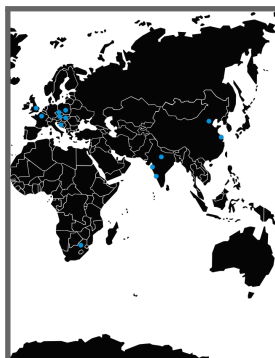
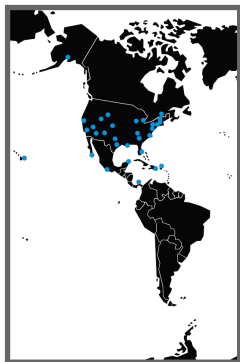
2010 Inducted into National Honorary Fraternity for ME (Pi Tau Sigma)



## Places Lived

Houston, TX  
Chicago, IL  
Amherst, MA  
Northampton, MA

## Places Traveled



## Course Projects

- 11/15 - 12/15 **Deep Learning with Runge-Kutta** [UMass Deep Learning](#)  
Compared various embedded Runge-Kutta (RK) methods against Adagrad and Nesterov with momentum.
- 11/14 - 12/14 **WeTube** [UMass Systems](#)  
Designed a P2P system in Go for watching YouTube videos synchronously across machines.
- 09/14 - 10/14 **Browser Python Interpreter** [UMass Systems](#)  
Wrote a Typescript program for parsing and executing Python bytecode in the browser. [Team Project]
- 01/14 - 05/14 **Roger the Crab** [UMass Robotics](#)  
Employed a combination of PD controllers, Kalman filters, FSMs, and stereo triangulation to equip a virtual ping-pong playing bot in C++.
- 11/13 - 12/13 **Draft Day Catastrophe** [UMass Machine Learning](#)  
Populated missing NFL combine data using several ML algorithms including a novel application of manifold alignment to data boosting. [Team Project]
- 04/10 - 06/10 **Gear Box Design** [NU Theory of Machines](#)  
Wrote Matlab code to minimize gear forces and volume under size, velocity ratio, and durability constraints. [Team Project]
- 01/10 - 06/10 **Honeycomb Truss** [NU Stress Analysis](#)  
Designed truss with nature-inspired “hairy honeycomb” structure for a drastically reduced resonance response. [Team Project]
- 09/09 - 12/09 **Lagrangian Mechanics** [NU Theory of Machine Dynamics](#)  
Simulated the dynamics of a spring-mass damper system sliding down a spiral rod through automated derivation of its Euler-Lagrange equations of motion with Mathematica.
- 04/09 - 06/09 **Object Vibration Dynamics** [NU Independent Study](#)  
Designed a Matlab *simulator* for vibration of 2D polygons which identified stable periodic orbits amidst intervals of chaos.

## Select Publications

- [1] **I. Gemp**, S. Mahadevan. “Global Convergence to the Equilibrium of GANs using Variational Inequalities”. arXiv. 2018.
- [2] **I. Gemp**, M. Parente, S. Mahadevan. “Inverting VAEs for Improved Generative Accuracy”. NIPS Workshop: Advances in Approximate Bayesian Inference. 2017.
- [3] **I. Gemp**, S. Mahadevan. “Online Monotone Games”. arXiv. 2017.
- [4] I. Durugkar\*, **I. Gemp\***, S. Mahadevan. “Generative Multi-Adversarial Networks”. ICLR. 2017. \*Equal contribution.
- [5] **I. Gemp**, G. Theocharous, M. Ghavamzadeh. “Automated Data Cleansing through Meta-Learning”. IAAI Challenge Paper. 2017.
- [6] **I. Gemp**. “Exploring the Dynamics of Variational Inequality Games with Non-Concave Utilities”. NIPS Workshop: Learning, Inference, and Control of Multi-Agent Systems. 2015.
- [7] **I. Gemp**, S. Mahadevan. “Finding Equilibria in Large Games using Variational Inequalities”. AAAI Spring Symposium. 2015.
- [8] S. Mahadevan, B. Liu, P. Thomas, W. Dabney, S. Giguere, N. Jacek, **I. Gemp**, J. Liu. “Proximal Reinforcement Learning: A New Theory of Sequential Decision Making in Primal-Dual Spaces”. arXiv. 2014.
- [9] **I. Gemp**, R. Carthew, S. Hilgenfeldt. “Cadherin-dependent cell morphology in an epithelium: constructing a quantitative dynamical model”. PLoS Computational Biology. 2011.