








# Robert S. Pienta

Researcher, Data Scientist

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## Summary

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My research blends methods, techniques, and principles from visual analytics, machine learning, and data mining to create new, interactive, tools that empower analysts when exploring, querying, and analyzing large networks. My work enables analysts to: quickly explore massive graphs from a local perspective (FACETS), visually formulate expressive graph queries with graph autocomplete (VISAGE), and summarize large numbers of graph query results (VIGOR).

## Education

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- Aug. 2017 — **Ph.D. in Computational Science and Engineering**  
Aug. 2011 *Georgia Institute of Technology, Atlanta, GA*  
**Thesis** “Adaptive Visual Network Analytics: Algorithms, Interfaces, and Systems for Exploration and Querying”  
**Advisor** Duen Horng (Polo) Chau  
**Committee** Shamkant Navathe, James Abello, Jilles Vreeken, Hanghang Tong, Bistra Dilkina, Alex Endert
  
- May 2011 — **B.S. Computer Science**  
Aug. 2007 **Double Major Mathematics**  
*Rose-Hulman Institute of Technology, Terre Haute, IN*

## Research Experience

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- Summer 2016 **Pindrop Security, Atlanta, GA**  
**Research Intern (Ph.D.)**  
Created a visual analytics system to track the changes in telephone scams. Developed techniques to collect, measure, and chart the landscape of fraud in the telephony channel.  
*Principal Investigator: Terry Nelms*

- Summer 2015 **Pindrop Security, Atlanta, GA**  
**Research Intern (Ph.D.)**  
 Leveraged large heterogeneous data to supplement machine learning methods which improved the quality of fraud detection and prediction. Prototyped a visual-analytics system to flag suspicious call behavior as it occurs.  
*Principal Investigator: David Dewey*
- Summer 2014 **Google, Mountain View, CA**  
**Ph.D. Software Engineering Intern**  
 Improving Ad-Quality Filtering - Designed and implemented a series of entropy-based filters to improve the quality of matched ads.  
*Host: Esteban Real*
- Fall 2013 **LogicBlox, Atlanta, GA**  
**Ph.D. Intern**  
 Tested and compared high performance tuple-matching queries on a custom database management system against industry competitors.  
*Mentor: Molham Aref*
- Summer 2013 **Google, Mountain View, CA**  
**Ph.D. Software Engineering Intern**  
 Designed methods and visualizations to help engineers interactively compare and contrast predictive-model performance.  
*Host: Yanli Cai*
- Summer 2010 **University of Houston, Houston, TX — Computational Physiology Laboratory**  
**Ph.D. Software Engineering Intern**  
 Designed and developed facial recognition algorithms in the thermal domain. Approach utilized a physiological taxonomy of facial expressions based on underlying musculature.  
*Principal Investigator: Ioannis Pavlidis*
- Summer 2009 **University of Iowa, Iowa City, IA**  
**Software Engineer**
- 2009–2010 **Eli Lilly and Company, Terre Haute, IN**  
**Software Engineer Intern**

## Honors & Awards

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- 2017 **Best Demo, Honorable Mention** at ACM SIGMOD/PODS Conference
- 2015–2017 **FLAMEL Fellowship**, a doctoral training (NSF IGERT) program designed to innovate in computing, mathematics, material science, and manufacturing to accelerate the creation of new high performance materials.
- 2011–2015 **President's Fellowship**, offered annually to a select number of highly qualified U.S. citizens or permanent residents, who bring exemplary levels of scholarship and innovation.
- 2010 **Best Poster**, Computational Science and Cybersecurity, University of Houston
- 2007–2011 **Dean's List**, Rose-Hulman Institute of Technology

## Publications

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**VIGOR: Interactive Visual Exploration of Graph Query Results.** Robert Pienta, Fred Hohman, Alex Endert, Acar Tamersoy, Kevin Roundy, Chris Gates, Shamkant Navathe, Duen Horng (Polo) Chau. In IEEE Transactions on Visualization and Computer Graphics (VAST). 2017.

**Visual Graph Query Construction and Refinement.** [Best Demo: Honorable Mention] Robert Pienta, Fred Hohman, Acar Tamersoy, Alex Endert, Shamkant Navathe, Hanghang Tong, and Duen Horng (Polo) Chau. In Proceedings of the ACM International Conference on Management of Data (SIGMOD). Pages 1587-1590, 2017.

**Carina: Interactive Million-Node Graph Visualization using Web Browser Technologies.** Dezhi (Andy) Fang, Matthew Keezer, Jacob Williams, Kshitij Kulkarni, Robert Pienta, Duen Horng (Polo) Chau. In Proceedings of the 26th International Conference on World Wide Web Companion (WWW). Pages 775-776, 2017

**Facets: Adaptive Local Exploration of Large Graphs.** Robert Pienta, Minsuk (Brian) Kahng, Zhiyuan Lin, Jilles Vreeken, Partha Talukdar, James Abello, Ganesh Parameswaran, Duen Horng (Polo) Chau. In the Proceedings of the Society for Industrial and Applied Mathematics International Conference on Data Mining (SDM). 2017.

**Uncovering the Landscape of Fraud and Spam in the Telephony Channel.** Aude Marzuoli, Hassan Kingravi, David Dewey, and Robert Pienta. In the 15th IEEE International Conference on Machine Learning and Applications (ICMLA). 2016.

**VISAGE: Interactive Visual Graph Querying.** Robert Pienta, Acar Tamersoy, Alex Endert, Shamkant B. Navathe, Hanghang Tong, Duen Horng (Polo) Chau. In the Proceedings of the 13th International Working Conference on Advanced Visual Interfaces (AVI). 2016.

**Making Sense of Graph Query Results: Interactive Summarization and Exploration.** Robert Pienta, Alex Endert, Shamkant Navathe, Duen Horng Chau. Poster Abstract in IEEE Visual Analytics Science and Technology (VAST). 2016.

**STEPS: A Spatio-temporal Electric Power Systems Visualization.** Robert Pienta, Leilei Xiong, Santiago Grijalva, Duen Horng Chau, Minsuk Kahng. In Proceedings of the 20th International Conference on Intelligent User Interfaces Companion (IUI). 2016.

**Call me: Gathering threat intelligence on telephony scams to detect fraud.** Aude Marzuoli, Hassan Kingravi, David Dewey, Aaron Dallas, Telvis Calhoun, Terry Nelms, and Robert Pienta. Blackhat Security Conference. 2016.

**A Visual Analytics Approach to Understanding Care Process Variation and Conformance.** Rahul C. Basole, Hyunwoo Park, Mayank Gupta, Mark L. Braunstein, Duen Horng Chau, Michael Thompson, Vikas Kumar, Robert Pienta, and Minsuk Kahng. In Proceedings of the Workshop on Visual Analytics in Healthcare (VAHC). 2015.

**GraSP: Distributed Streaming Graph Partitioning.** Casey Battaglino, Robert Pienta, and Richard Vuduc, In Knowledge Discovery and Datamining Workshop on High Performance Graph Mining (HPGM). 2015.

**AdaptiveNav: Adaptive Discovery of Interesting and Surprising Nodes in Large Graphs.**

Robert Pienta, Zhiyuan Lin, Minsuk Kahng, Jilles Vreeken, Partha P. Talukdar, James Abello, Ganesh Parameswaran, and Duen Horng Chau. Poster Abstract in IEEE Visual Analytics Science and Technology (VAST). 2015.

**Scalable graph exploration and visualization: Sensemaking challenges and opportunities.** Robert Pienta, James Abello, Minsuk Kahng, and Duen Horng Chau. In International Conference on Big Data and Smart Computing, (BIGCOMP). Pages 271-278, 2015.

**Interactive Querying over Large Network Data: Scalability, Visualization, and Interaction Design.** Robert Pienta, Acar Tamersoy, Hanghang Tong, Alex Endert, and Duen Horng Chau. In Proceedings of the 20th International Conference on Intelligent User Interfaces Companion (IUI). Pages 61-64, 2015.

**Identifying Successful Investors in the Startup Ecosystem.** Srishti Gupta, Robert Pienta, Acar Tamersoy, Duen Horng Chau; and Rahul C. Basole. In the Proceedings of the World Wide Web Conference (WWW). 2015.

**MAGE: Matching approximate patterns in richly-attributed graphs.** Robert Pienta, Acar Tamersoy, Hanghang Tong, and Duen Horng Chau. In IEEE International Conference on Big Data (BigData). Pages 585-590, 2014.

**Towards scalable graph computation on mobile devices.** Yiqi Chen, Zhiyuan Lin, Robert Pienta, Minsuk Kahng, and Duen Horng Chau. In IEEE International Conference on Big Data (BigData). Pages 29-35, 2014.

**On the parallel simulation of scale-free networks.** Robert Pienta, S.; and Richard M. Fujimoto. In SIGSIM In SIGSIM Principles of Advanced Discrete Simulation (SIGSIM-PADS). Pages 179-188, 2013.

**A Comparative Analysis of Thermal and Visual Modalities for Automated Facial Expression Recognition.** Avinash Wesley, Pradeep Buddharaju, Robert Pienta, and Ioannis Pavlidis. In Advances in Visual Computing - 8th International Symposium (ISVC). Pages 51-60, 2012.

## Invited Talks & Presentations

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**Ph.D. Thesis: "Adaptive Visual Network Analytics: Algorithms, Interfaces, and Systems for Exploration and Querying"**

Jun 28, 2017 Ph.D. Defense, Georgia Tech, Atlanta, GA, USA

Apr 6, 2016 Ph.D. Proposal, Georgia Tech, Atlanta, GA, USA

**VISAGE: Visual Graph Query Construction and Refinement**

May 18, 2017 IEEE SIGMOD Best-of Demonstration Session, Chicago, IL, USA

May 15, 2017 IEEE SIGMOD Demonstration, Chicago, IL, USA

Nov 8, 2016 Georgia Tech Hot CSE Presentation, Atlanta, GA, USA

Jun 10, 2016 ACM AVI Paper Talk, Bari, Italy  
Mar 30, 2016 ACM IUI Poster Presentation and Fast Forward, Atlanta, GA, USA

### **VIGOR: Visualizing, Summarizing, and Comparing Graph Query Results**

Oct 2, 2017 (to appear) IEEE VAST Paper Presentation, Phoenix, AZ, USA  
Oct 26, 2016 IEEE VIS Poster Presentation and Fast Forward, Baltimore, MD, USA

### **FACETS: Adaptive Local Exploration of Large Graphs**

Apr 28, 2017 SIAM SDM Paper Talk, Houston, TX, USA  
Apr 17, 2017 Presentation at Machine Learning at Georgia Tech (ML@GT), Atlanta, GA, USA  
Oct 26, 2015 IEEE VIS Poster Presentation and Fast Forward, Chicago, IL, USA

### **Pindrop Culminating Research Presentation**

Aug 12, 2016 Presentation to Management and Research at Pindrop, Atlanta, GA, USA  
Aug 9, 2015 Presentation to Research and Engineering at Pindrop, Atlanta, GA, USA

### **Google Intern Final Presentation**

Aug 12, 2016 Presentation to managers to launch my code at Google! Mountain View, CA, USA  
Aug 9, 2015 Presentation of completed projects at Google, Mountain View, CA, USA

### **FLAMEL (NSF Fellowship)**

Apr 25, 2017 Presentation to Board of Directors, Atlanta, GA, USA  
Nov 19, 2016 *Human in the loop material science image segmentation*, Atlanta, GA, USA  
Aug 9, 2016 Invited Panelist, Atlanta, GA, USA  
Mar 12, 2016 Computational Material Science Chalk Talk, Atlanta, GA, USA  
Jan 12, 2015 Invited Panelist, Atlanta, GA, USA

### **MAGE: Approximate Graph Querying**

Mar 28, 2015 Georgia Tech Hot CSE Presentation, Atlanta, GA, USA  
Oct 28, 2014 IEEE Bigdata Paper Talk, Washington, DC, USA

### **STEPS: Spatio-temporal Electrical Network Visualization**

Mar 8, 2016 ACM IUI Short Paper Talk, Sonoma, CA, USA

### **Fraud in the telephony channel**

Dec 19, 2016 IEEE ICMLA Paper Talk, Irvine, CA, USA

### **Nerd Nite: Nerdy Talks for Everyone**

Sep 9, 2016 *Is Dwarf Fortress Art?*, Atlanta, GA, USA  
Aug 22, 2016 *Findings from Mining Craigslist Missed Connections*, Atlanta, GA, USA

### **InvestorRank: Identifying Successful Investors in the Startup Ecosystem**

May 19, 2015 IEEE WWW Short Paper Talk, Florence, Italy

## Teaching, Guest Lecturing & Mentoring

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- Spring 2016 **Volunteer Instructor**  
*Georgia Institute of Technology, Atlanta, GA*  
As part of the FLAMEL program, taught how to use the python programming language for material science automation, modeling, and analysis.
- Spring 2015 **Guest Lecturer**  
*Georgia Institute of Technology, Atlanta, GA*  
Guest lectured in the graduate Data and Visual Analytics course (CSE 6242) for Polo Chau.  
**Over 180 students!**
- Spring 2014 **Graduate Teaching Assistant**  
*Georgia Institute of Technology, Atlanta, GA*  
Assisted in teaching and administering the graduate Data and Visual Analytics course (CSE 6242). **Over 100 students!**
- Spring 2012 **Graduate Teaching Assistant**  
*Georgia Institute of Technology, Atlanta, GA*  
Assisted in teaching and administering Advanced Modeling and Simulation: Fundamentals & Implementation (CSE6730)
- Mentor**  
*Georgia Institute of Technology, Atlanta, GA*  
2015 Srishti Gupta, Master's Student, CSE  
2013-2014 Zhiyuan Lin, Undergraduate Student, CS  
2015-2017 Dezhi Fang, Undergraduate Student, CS

## Technical Skills

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**Programming:** Python, Javascript, C/C++, R, SQL, Cypher

**Web & Visualization:** D3, React, WebGL, Three.js, Deck.gl, MapboxGL

**High Performance Computing:** MapReduce, OpenMP, MPI

**Design:** Photoshop, Lightroom, Premiere, Affinity Designer

## Professional & Academic Service

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### Reviewer or Program Committee Member

- 2015-2017 KDD  
2016 WWW  
2016-2017 IDEA  
2017 SDM  
2014-2016 CHI  
2014-2016 IUI

2017 TIST Journal  
2017 BigData  
2016 Idea Workshop

**Member**

2016-2017 Society for Applied Mathematics (**SIAM**)  
2014-2017 Association for Computing Machinery (**ACM**)  
2012-2017 Institute of Electrical and Electronics Engineers (**IEEE**)  
2009-2011 Member of Pi Mu Epsilon  
2008-2011 Member of Upsilon Pi Epsilon  
2009-2011 Vice President of Upsilon Pi Epsilon

References available upon request. Live long and prosper. 🙌

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