Andrew T. **Burks**

Ph.D. Computer Science Student

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Education

Electronic Visualization Laboratory, University of Illinois at Chicago

Chicago, IL

Ph.D. in Computer Science *January 2018 - Current*

- Research Focus on Designing Effective Systems for Collaborative Data Exploration and Visualization
- *Advisor*: Prof. Andrew Johnson

University of Illinois at Chicago

Chicago, IL

B.S. Computer Science *August 2013 - December 2017*

- Research Focus on Human Computer Interaction and Data Visualization/Visual Analytics with Research Experience for Undergraduates (REU) support from the UIC Electronic Visualization Laboratory (EVL)
- **Honors**: *cum laude*
- **Major GPA**: 3.83

Experience

Electronic Visualization Laboratory, UIC

Chicago, IL

Graduate Research Assistant *January 2018 — Present*

SAGE2™ is an NSF $5M project to build a web-based system for tiled display walls to enhance data intensive co-located and remote collaboration. My research in SAGE2 focuses on providing expressive support to collaborative data exploration workflows. My first two projects were an application for visualizing arbitrary Comma-Separated Value (CSV) formatted data, and a layout system which supports the application of geometric layout constraints to digital content in the freeform collaborative workspace. My current research focuses on supporting data exploration within the SAGE2 workspace. To this end, I have created a JupyterLab extension allowing users to display notebooks and reactive notebook cells in SAGE2. To build native support into SAGE2 for the exploratory analysis seen in Jupyter Notebooks, I designed and implemented the *VisSnippets* system in SAGE2. Supporting impromptu collaborative data exploration, VisSnippets allows users to write and compose modular analysis blocks for data retrieval, transformation/analysis, and visualization into branching data pipelines.

United Airlines

Chicago, IL

Data Visualization Intern *May — August 2018*

In a collaborative effort across divisions in United Airlines, including the Data Analytics, Global Operations, Airport Operations, IT, and UI/UX teams, I created a web based visualization tool for operational workflow support. This project aimed to support the workflow of key airport operations employees, integrating diverse data sources to allow for quick, effective decision making. This real-time visualization tool received positive feedback from those in the project work group as well as the users: front-line employees. I was invited to present this work to the CEO, President, COO, CDO, and other high-ranking officials as an example of innovative work within the Digital branch of company.

Electronic Visualization Laboratory, UIC

Chicago, IL

Undergraduate Research Assistant *May 2016 — December 2017*

- ***Context-aware Visual-Analysis of Englewood Social Services*** is a tool developed for social good — connecting the youth from Chicago's Englewood neighborhood with necessary services. I led my team of 3 to create and deploy an open-source, web-based tool to help employees and volunteers connect children with social services, as well as an analytics layer built atop this tool to allow for the analysis of social service distribution in relation to publicly available census data.
- ***Interactive Exploration and Tracking of Ensemble Viscous Fingers*** is an interactive web-based visualization of ensemble fluid dynamics simulation data. I presented this work at the IEEE VIS 2016 conference in a short, 5 minute talk. Creating the tool, I learned about data/task analysis, visual encodings, and web-based interactive visualization of large datasets. We developed a front-end using Javascript, D3.js, and three.js, as well as a back-end module for feature identification and tracking. This work has now been published in IEEE VIS.

UIC Department of Computer Science

Chicago, IL

Undergraduate Peer Tutor *January — May 2016*

- Tutored peers on all beginner, intermediate, and advanced Computer Science coursework

Science and Arts Academy

Des Plaines, IL

Summer Camp Teacher/Counselor *Summer 2014 and 2015*

- Developed Java lessons targeted toward Elementary and Middle School age children
- Lead hands-on activities for children ages 8-13 to learn programming based on the lessons I created
- Coordinated camp activities with peers for children ages 5 to 13

Publications

Conference Papers

C3 **A. Burks**, L. Renambot, A. Johnson "VisSnippets: A Web-Based System for Impromptu Collaborative Data Exploration on Large Displays", Proc. ACM Human Factors in Computing Systems (CHI), pp. 1-9. Under Review.

C2 T. Luciani, **A. Burks**, C. Sugiyama, J. Komperda, and G.E. Marai. "Details first, show context, overview last: Supporting Exploration of Viscous Fingers in Large-Scale Ensemble Simulations", IEEE Transactions on Visualization and Computer Graphics (Proc. SciVis'18), pp. 1-10, Jan 2019.

C1 A. G. Forbes, **A. Burks**, K. Lee, X. Li, P. Boutillier, J. Krivine, and W. Fontana. "Dynamic Influence Networks for Rule-based Models", IEEE Transactions on Visualization and Computer Graphics (Proc. VAST'17), pp. 1-11, Jan 2018.

Journal Articles

J1 G. E. Marai, C. Ma, **A. Burks**, et al. "Precision Risk Analysis of Cancer Therapy with Interactive Nomograms and Survival Plots", IEEE Transactions on Visualization and Computer Graphics, pp. 1-13. 2018

Short Papers, Posters & Abstracts

S7 J. Castor, J. Borowicz, **A. Burks**, M. Thomas, T. Luciani, G.E. Marai, "MC2 - Mining Factory Pollution Data through a Spatial-Nonspatial Flow Approach", IEEE Visual Analytics Science and Technology (VAST) Challenge 2017 Proceedings, pp. 1-2, 2017. **Honorable Mention - Clarity in Visual Communication**

S6 V. Mahida, B. Kupiec, **A. Burks**, T. Luciani, G.E. Marai, "MC3 - A Web-Based Interactive Image Explorer for Temporal Analysis of Satellite Images", IEEE Visual Analytics Science and Technology (VAST) Challenge 2017 Proceedings, pp. 1-2, 2017. **Honorable Mention - Good Interactive Image Explorer**

S5 D. Kirilov, I. Lindmae, **A. Burks**, C. Ma, G.E. Marai. "MC1- A Bespoke Analysis Tool for Spatio-temporal Park Traffic Data", IEEE Visual Analytics Science and Technology (VAST) Challenge 2017 Proceedings, pp. 1-2, 2017.

S4 C. Ma, **A. Burks**, T. Luciani, A. Terebus, J. Liang, and G. E. Marai. "Visualizing ensemble time-evolving probability landscapes of stochastic networks", ISMB/ECCB 2017, pp. 1-2, BioVis'17

S3 T. Luciani, J. Trelles, C. Ma, **A. Burks**, M. Thomas, K. Bharadwaj, S. Singh, P. Hanula, L. Di, G.E. Marai. "Multi-scale Voronoi-based ACT Assessment". IEEE VGTC VPG International Data-Visualization Contest, Baltimore, MD, USA. **Honorable Mention**. Oct. 2016.

S2 **A. Burks**, C. Sugiyama, T. Luciani, J. Komperda, G. E. Marai. "Interactive Exploration and Tracking of Viscous Fingers in Large-Scale Ensemble Simulations", IEEE Scientific Visualization Contest, Oct. 2016. **Certificate of Merit**

S1 D. McNamara, J. Tapia, C. Ma, T. Luciani, **A. Burks**, J. Trelles, and G. E. Marai. "Spatial Analysis of Employee Safety Using Organizable Event Quiltmaps". In Proceedings of the IEEE VIS 2016 Workshop on Temporal and Sequential Event Analysis, Oct. 2016.

Invited Presentations

2018 **Data Visualization: Effective Design**, United Airlines *Chicago, IL*
2016 **Interactive Exploration and Tracking of Ensemble Viscous Fingers**, IEEE SciVis'16 Contest *Baltimore, MD*

Professional Activities

Reviewer CHI Conference on Human Factors in Computing Systems *2018 — Present*
Volunteer SCinet at the SuperComputing Conference — Network Instrumentation Visualization *2017 — Present*
Member Institute of Electrical and Electronics Engineers (IEEE) *2015 — Present*

Honors & Awards

2017 **Honorable Mention**, IEEE VIS 2017 VAST Challenge Mini-Challenge 2 *Phoenix, AZ*
Honorable Mention, IEEE VIS 2017 VAST Challenge Mini-Challenge 3 *Phoenix, AZ*
2016 **Honorable Mention**, IEEE VIS Conference: VGTC VPG Data Visualization Contest *Baltimore, MD*

Selected Projects

Dynamic Influence Networks for Rule-Based Models

Visualization and Visual Analytics · Course Final Project *October 2016 - June 2017*

- Collaborated with researchers at Harvard Medical School to create a domain-specific tool for the exploration and analysis of protein-protein interaction simulations output by KaSim (Kappa Simulator)
- Prototyped visualization designs as a team to meet the needs of computational biologists
- Brainstormed methods to alleviate node-link diagram clutter as dataset size grows
- Implemented a clustered force-directed visualization for sliding time-window network data
- Wrote a IEEE VIS, TVCG track publication on our method and tool

The Fear Engine

Video Game Design · Course Final Project *January - May 2016*

- Developed a first-person video game built in Unity3D (C#)
- Collaborated with 2 classmates in a semester-long project
- Implemented a 2nd order Markov Chain AI system for enemies
- Brainstormed and described formal elements of game prior to implementation
- Gave weekly technical presentations of detailed project updates to peers

Skills

Languages JavaScript, TypeScript, Python, Java, C/C++, HTML, CSS, SQL, C#, F#

Libraries and Tools D3.js, Node.js, Three.js, React, WebSocket, Leaflet.js, REST, SODA, OpenGL, MongoDB

Selected Coursework

Undergraduate Design/Research *(Topic: Data Visualization)*, Visualization and Visual Analytics, Computer Graphics I, Computer Graphics II *(Topic: Interactive Scientific Visualization)*, Artificial Intelligence I, Intro. to Machine Learning, User Interface Design and Implementation, Empirical Methods in Human-Centered Computing