Daniel Orban

Computer Scientist

Highly motivated technical professional with over **20+ years** of **professional**, **research**, and **teaching** experience. I have a **diverse background** that has fostered strong verbal, listening, and writing skills. My research interests include **simulation**, **scientific visualization** and **high-dimensional analysis**. I am able to negotiate and problem solve quickly, accurately, and efficiently. I am also a quick learner with a strong desire to teach others.

Personal Info

Address

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Skills

Software Engineering

High-Dimensional Visualization

Scientific Visualization

Computer Graphics / Virtual Reality

High-Performance Computing

Teaching Mathematics and Computer Science

Network Programming

Technical Skills

Languages:
C/C++, C#, Java, Javascript, Python, JSP, Ruby on Rails, ML.

Graphics / Rendering:
Vulkan, OpenGL, WebGL, GLSL/HLSL, GPU Architecture, Shaders, Graphics Pipeline,

Education

2015-01 - 2021-09	**PhD. in Computer Science**
	University of Minnesota, MN

- Member of the Interactive Visualization Lab (IVLab).
- Research focused on interactive computer graphics and high-dimensional data visualization for scientific applications.

2015-01 - 2019-09	**Masters of Computer Science**
	University of Minnesota, MN

1998-08 - 2002-05	**Bachelors of Computer Science and Mathematics**
	Oklahoma State University, OK

- Minor in philosophy.
- General Honors Award.

Professional Experience

2014-01 - Present	**Technology Consultant**
	Minneapolis, MN

- Freelance work with industry professionals. Technologies include the latest in Python, Javascript, REST APIs, Angular, React, Django, Java, Docker, REST APIs, Node.js, Public Key Cryptography (JWT / TLS), MySQL, SQL Server, SSH, Cloud, Linux, Bash, and Git.

2022-01 - Present	**Research and Development / Curriculum Design**
	CreateMPLs, Minneapolis, MN

- Researched STEM curriculum for K-12 students and developed to be used in public and private schools.
- Integrated device software for the Arduino and Raspberry PI for using brushless motors and sensors.
- Developed and implemented curriculum for building, programming, and flying drones for high school students.
- Mentored college students on how to build a drone simulator with physics and graphics.
- Drone Bootcamp - Brooklyn Center (Summer 2022)
- Drone Bootcamp - Relentless Academy (Summer 2022)
- Introduction to Robotics - Hope Academy (Spring 2022)

Textures, Deferred Rendering, MinVR, GLFW, VRPN. Blender

Technologies:, NetCDF, XML, UML, SQL, TCP/IP, UDP, FAST Data Search, Entity Framework, Betaflight

Web:
Javascript, REST API, HTML, CSS, Node.js, Angular, React, Django, WebGL, Three.js, D3, JQuery, VTK-js, Spring MVC, JSF, ASP.NET, WPF, GWT, Ruby on Rails, WebSockets, SOAP

Cloud:
Docker, AWS, EC2, S3, Appistry, Hadoop, VMware

Source Control / Build:
GIT, SVN, TFS, CMake, GTest

Databases:
MySQL, PostgreSQL, SQL Server, Oracle, SQLite, SimpleDB

Platforms:
Linux, Microsoft Windows, Mac OS., Unix

Commodity Exchanges:
FIX/FIXML, QuickFix, CME, ICE, TT, Nodal Exchange

Awards

PSOC Pilot Project Program Grant Award
University of Minnesota Physical Sciences in Oncology Center
(December, 2018)

Thank a Teacher Award
University of Minnesota Center for Educational Innovation, (Spring 2018, Fall 2019, Summer 2020)

Grand Prize Poster Winner
Minnesota Supercomputing Institute Research Exhibition
(2016)

S&P I/T Directors Award
Dell Inc. (2004)

Competent Communicator
Toastmasters International
(October 2006)

- STEM Block - Heritage STEM Academy, Minneapolis Public Schools (Spring 2022)

2021-09 - 2022-01	**Lecturer**

University of Minnesota, MN

- CSCI 3081 - Program Design & Development (Fall 2021)

2020-06 - 2021-05	**PhD Candidate Graduate Instructor**

University of Minnesota, MN

- CSCI 2011 - Discrete Structures of Computer Science (Spring 2021)
- CSCI 3081 - Program Design & Development (Fall 2020)
- CSCI 1113 - Introduction to C/C++ Programming for Scientists and Engineers (Summer 2020)

2016-01 - 2019-12	**Teaching Assistant**

University of Minnesota, MN

- CSCI 4611 - Programming Interactive Computer Graphics and Games (Fall 2019, Spring 2018)
- CSCI 3081 - Program Design & Development (Spring 2019, Fall 2018, Spring 2016)
- CSCI 5619: Virtual Reality and 3D Interaction (Fall 2017)
- CSCI 2011 - Discrete Structures of Computer Science (Fall 2017)
- CSCI 5421 - Advanced Algorithms & Data Structures (Spring 2017)

2018-05 - 2018-08	**Graduate Student Intern**

Los Alamos National Laboratory, Los Alamos, NM

2017-05 - 2017-08	

- Worked closely with material scientists and experimentalists to improve the visual analysis of shock physics experiments.
- Implemented an ensemble visualization tool called Cinema:Bandit, allowing users to view filtered velocimetry data, x-ray diffraction images, and integration curves.
- Contributed to several beamline experiments at the Stanford Linear Accelerator Center (SLAC) by using a continuous workflow for visual analysis.
- Developed Cinema:Quest, a predictive analysis tool for analyzing high-dimensional data using dimensionally reduced views and direct manipulation.

2014-02 - 2014-12	**Computer Graphics Programmer**

Computer Science Department, University of Minnesota, MN

- Extended functionality for Virtual Interactive Table System (ISliceWIM) for medical device design.
- Worked closely with medical device companies to implement FEA Analysis volume visualization in virtual reality.
- Created flexible scene file format for transforming and aggregating mesh file formats for real-time manipulation.
- Implemented VisCDF, an open source toolkit written in C++ for visualizing scientific data using the NetCDF format.
- Assisted graduate and undergraduate students technically in their research.

2012-08 -
2014-02

Software Developer

OATI Inc, Minneapolis, MN

- Lead for WebREC, a renewable energy credit (REC) tracker for resource energy generation.
- Architected core attribution engine to allocate energy and RECs to various contracts and markets. Uses OO design to flexibly allow the user to create, customize, and debug rules in C# / .NET.
- Extended core company functionality to build powerful data pivot functionality which takes objects and dynamically builds reports based on the user's chosen properties or dimensions.
- Became technical expert of WebFinancial, a live financial trading analytics application. Implemented real-time quotes and live profit and loss updates for futures, swaps, physicals, and options.
- Designed and implemented FIX / FIXML trade capture adapters to interface with live commodity exchanges including the Intercontinental Exchange (ICE), the Chicago Mercantile Exchange (CME), Trading Technologies (TT), and the Nodal Exchange. Also used QuickFix as underlying framework for energy and financial trades.

2011-08 -
2012-06

High School Technology Teacher

Hope Academy, Minneapolis, MN

- Taught 11th and 12th grade students typing, spreadsheets, programming, search engine optimization, and website design.
- Lead and organized the HopeWORKS Summer Internship Program for Hope Academy students.

2010-08 -
2010-10

Software Contractor

BCforward, Austin, TX

- Extended Cloud Map/Reduce (CMR) project for Accenture to use the Appistry Cloud environment.
- Redesigned CMR application to flexibly use a variety of distributed infrastructures.
- Designed CMR for no single point of failure and incremental processing of previous aggregations.
- Created serialized storage model which allows for streaming aggregation of successive runs.

2009-09 -
2010-09

Alternative Teacher Certification Candidate

Texas Teacher Alternative Certification Program, Austin, TX

- Eligible for probationary certificate to teach high school math and computer science in Texas.
- Substitute teacher for Austin Independent School District.
- Observed classrooms in Vandegrift High School and Westwood High School.
- Attended Texas Teacher Alternative Certification training in classroom management, lesson design, differentiated learning, assessments, and effective teaching.

2007-04 -
2009-05

Research Associate

Accenture Technology Labs, San Jose, CA

- Designed and implemented Cloud Map/Reduce (CMR) in Java using EC2, S3, SQS, and Simple DB.
- Investigated network topology discovery and optimization techniques with TCP/IP socket programming.
- Discovered network security risk involving bandwidth limitations in shared resource environments.
- Designed Remote Network Labs in Java, AJAX, and the Google Web Toolkit (GWT), which allows users to test network configurations from a pool of distributed physical network devices.
- Modified and extended Hadoop file system and Hadoop map reduce framework to create Gridbatch. Gridbatch provides flexibility for data storage locality and enables tasks similar to map or reduce.
- Published peer reviewed papers on distributed computing, cloud computing, and network virtualization.
- Delivered interactive presentations on synthetic biology, networking, and distributed computing.

| 2002-06 - 2006-10 | **Programmer Analyst** |
| | *Dell Inc., Round Rock, TX* |

- Technical lead and senior developer for the Software and Peripherals online web application, a large scale, real-time, performance-sensitive, customer facing, production application written in C#, ASP.NET.
- Promoted flexibility using object oriented techniques, efficient coding, and design patterns.
- Wrote core pricing and business logic in C#. Compiled into libraries to be used across applications.
- Designed and developed production Dell.com Search application. Determined FAST Data Search indexes to optimize for flexibility and performance.
- Received S&P I/T Director's Award in 2004 for efforts and teamwork.
- Used multithreading in C# and Microsoft SQL Server stored procedures to update search index.
- Administered Microsoft SQL Server application databases, and optimized queries.
- Automated application build using VSS, NAnt, and Cruise Control.
- Trained Brazil global developers as project lead. Mentored replacement for global development lead.

| 2000-01 - 2002-05 | **Mathematics Tutor** |
| | *Mathematics Learning Resource Center, Oklahoma State University, Stillwater, OK* |

- Tutored college students in basic math, algebra, geometry, trigonometry, precalculus, and calculus.

Selected Publications

- **Daniel Orban**. *Data-Driven Exploratory Interfaces for Contextualizing Parameter Spaces: Adding Intuition to Big Data* (Doctoral dissertation, University of Minnesota). (2021)

- **Daniel Orban**, Divya Banesh, Cameron Tauxe, Christopher M. Biwer, Ayan Biswas, Ramon Saavedra, Christine Sweeney et al. "Cinema: Bandit: a visualization application for beamline science demonstrated on XFEL shock physics experiments." *Journal of Synchrotron Radiation* 27, no. 1 (2020).

- Seth Johnson, **Daniel Orban**, Hakizumwami Birali Runesha, Lingyu Meng, Bethany Juhnke, Arthur Erdman, Francesca Samsel, Daniel F. Keefe. "Bento Box: An Interactive and Zoomable Small Multiples Technique for Visualizing 4D Simulation Ensembles in Virtual Reality." Frontiers in Robotics and AI 6 (2019): 61.

- **Orban, Daniel**, Daniel F. Keefe, Ayan Biswas, James Ahrens, David Rogers. "Drag and Track: A Direct Manipulation Interface for Contextualizing Data Instances within a Continuous Parameter Space." *IEEE transactions on visualization and computer graphics* 25.1 (2019): 256-266.

- **Daniel Orban**, Seth Johnson, Hakizumwami Birali Runesha,, Lingyu Meng, Bethany Juhnke, Arthur Erdman, Francesca Samsel, Daniel F. Keefe. "Poster: Comparison of Multiple Large Fluid-Structure Interaction Simulations in Virtual Reality." *Symposium on Large Data Analysis and Visualization*, IEEE (2018)

- Bethany Tourek, **Daniel Orban**, Bogden Tanasoiu, Hakizumwami Birali Runesha, Daniel F. Keefe, Arthur G. Erdman. "Poster: Inverse Design Process: New Methodology to Design Medical Devices with BIG DATA." *Minnesota Supercomputing Institute Research Exhibition.* (2016)

- Liu, Huan, and **Dan Orban**. "Cloud mapreduce: A mapreduce implementation on top of a cloud operating system." *Proceedings of the 2011 11th IEEE/ACM international symposium on cluster, cloud and grid computing*. IEEE Computer Society, 2011.

- Liu, Huan, and **Dan Orban**. "Remote network labs: An on-demand network cloud for configuration testing." *ACM SIGCOMM Computer Communication Review* 40.1 (2010): 83-91.

- Liu, Huan, and **Dan Orban**. "Computing median values in a cloud environment using GridBatch and MapReduce." *Cluster Computing and Workshops, 2009. CLUSTER'09. IEEE International Conference on*. IEEE, 2009.

- Liu, Huan, and **Dan Orban**. "Gridbatch: Cloud computing for large-scale data-intensive batch applications." *Cluster Computing and the Grid, 2008. CCGRID'08. 8th IEEE International Symposium on*. IEEE, 2008.