
Kalina Borkiewicz

Director of Visualization

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EXPERIENCE



National Center for Supercomputing Applications

2022 - PRESENT *Director, Visualization Program Office*

2021 - PRESENT *Director, Advanced Visualization Lab*

- Identifying new internal and external collaboration and funding opportunities.
- Managing staff and students working on multiple parallel projects.
- Writing grant proposals and research papers.
- Led strategic reorganization effort at the Center for 22 visualization staff.

2014 - 2022 *Junior → Senior → Principal Research Programmer*

- FX technical director for 9 documentary films and productions. Wrote software, Houdini plugins, and scripts to support pipelines. Primarily used C++ and Python, but also JavaScript, Bash, etc.
- Developed and documented internal and open-source software, such as [Ytini](#) which has 9,000 tutorial views at [ytini.com](#).
- Processed, cleaned, transformed, and wrangled big data of sizes 50GB - 50TB.
- Created supercomputer pipeline tools for seamless rendering of ~15,000 node-hours per day.



University of Illinois at Urbana-Champaign

2022 - PRESENT *Adjunct Instructor, Gies College of Business*

- Teaching BDI 513: Storytelling with Data, a graduate-level data visualization course.



Intelligent Medical Objects

2012 - 2014 *Software Engineer*

- Developed full-stack for web applications used by 98% of hospitals nationwide.
- Single-handedly programmed the company's Android app in Java, which was used by 500,000 medical professionals.



Talas Analytics

2011 - 2013 *Co-Founder & Android Developer*

- Developed an Android app for real-time visualization of stock market data.



University of Illinois at Urbana-Champaign

2011 - 2012 *Student Researcher*

- Led team of undergraduate and graduate students in developing a graphics web library used by mechanics professors to create interactive homework assignments.

EDUCATION

University of Illinois at Urbana-Champaign

2019 - 2021 *MCS Computer Science*

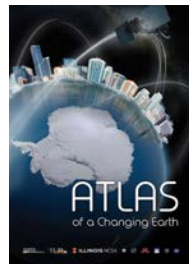
University of Illinois at Urbana-Champaign

2008 - 2012 *BS Computer Science*

PRODUCTIONS



Einstein's Incredible Universe (IMAX)
2024



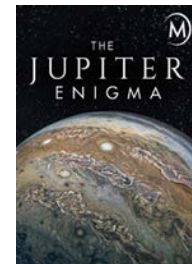
Atlas of a Changing Earth
(fulldome)
2021



Birth of Planet Earth
(fulldome)
2019



Earth's Call
(concert graphics)
2019



The Jupiter Enigma
(4K TV)
2019



Imagine the Moon
(fulldome)
2019



Seeing the Beginning of Time (4K TV)
2017



A Beautiful Planet
(IMAX)
2016



Super Tornado
(4K TV)
2015



Solar Superstorms
(fulldome)
2014

SELECT SOFTWARE PROJECTS



Open-source middleware between the scientific analysis/visualization Python package, yt, and the 3D animation software, Houdini. Downloads and tutorials available at ytini.com



A pipeline and resource-managing tool for rendering Houdini scenes with Mantra on the Blue Waters supercomputer



The Houdini-AVL Interface, a Houdini HDK scientific data visualization plugin



The Laboratory for Audience Interactive Technologies (LAIT) mobile app for use by audiences during live performances



A VR app for previewing fulldome content in virtual reality



The IMO Terminology Browser for Android, a mobile app to find medical codes for various coding systems, used by 500,000 medical professionals



A plugin tool for doctors to use to drill-down and track diagnoses

PUBLICATIONS

Journals

Jensen, E.J., Borkiewicz, K., Naiman, J. (2022). [What we know about how public audiences respond to cinematic scientific visualization](#). *Frontiers in Science & Environmental Communication*, 7. [DOI Link](#)

Borkiewicz, K., Jensen, E.J., Levy, S., Naiman, J., Carpenter, J. (2022). [Introducing cinematic scientific visualization: A new frontier in science communication](#) *London School of Economics Impact of Social Sciences*, [Link](#).

Sener, M., Levy, S., Stone, J. E., Christensen, A. J., Isralewitz, B., Patterson, R., Borkiewicz, K., Carpenter, J., Hunter, C. N., Luthy-Schulten, Z., Cox, D. (2021). [Multiscale modeling and cinematic visualization of photosynthetic energy conversion process from electronic to cell scales](#). *Parallel Computing*, [DOI Link](#)

Aleo, P. D., Lock, S. J., Cox, D. J., Levy, S. A., Naiman, J. P., Christensen, A. J., Borkiewicz, K., Patterson, R. (2020). [Clustering-informed cinematic astrophysical data visualization with application to the Moon-forming terrestrial synestia](#). *Astronomy And Computing*, 33. [DOI Link](#)

Borkiewicz, K., Naiman, J. P., & Lai, H. (2019). [Cinematic Visualization of Multiresolution Data: Ytini for Adaptive Mesh Refinement in Houdini](#). *The Astronomical Journal*, 158(1), 10. [DOI Link](#)

Naiman, J. P., Borkiewicz, K., & Christensen, A. J. (2017). [Houdini for Astrophysical Visualization](#). *Publications of the Astronomical Society of the Pacific*, 129(975), 058008. [DOI Link](#)

Conferences

Jensen, E., Borkiewicz, K., Naiman, J.P., Carpenter, J. (2022). [Evidence-based science communication and cinematic scientific visualization](#). *ACM SIGGRAPH Asia 2022 Courses*.

Borkiewicz, K., Levy S., Carpenter, J., Cox, D., Patterson, R., Christensen, A.J. (2022). ["Atlas of a Changing Earth" Visualization of the ArcticDEM Survey and Vavilov Ice Cap Collapse](#). *Supercomputing Conference 2022*. [Link](#)

Borkiewicz, K., Levy S., Carpenter, J., Cox, D., Patterson, R., Christensen, A.J. (2022) [Cinematic Scientific Visualization for the Documentary Film Atlas of a Changing Earth](#)". *IEEE Visualization Conference 2022 Viz4Climate*. [Link](#)

Jensen, E., Borkiewicz, K., Naiman, J.P., Carpenter, J. (2022). [Evidence-based science communication through cinematic scientific visualization](#). *ACM SIGGRAPH 2022 Courses*. [DOI Link](#)

Borkiewicz, K., Shah, V., Naiman, J.P., Shen, C., Levy, S., Carpenter, J. (2021). [CloudFindr: A Deep Learning Cloud Artifact Masker for Satellite DEM Data](#). *IEEE Visualization Conference 2021 papers*. [DOI Link](#)

Borkiewicz, K., Christensen, A. J., Wyatt, R., Wright, E. (2020). [Introduction to cinematic scientific visualization](#). *ACM SIGGRAPH 2020 Courses*. [DOI Link](#)

Borkiewicz, K., Christensen, A. J., Shirah, G., Elkins, K., Berry, D., & Fluke, C. (2019). [Cinematic scientific visualization: The art of communicating science](#). *ACM SIGGRAPH Asia 2019 Courses*. [DOI Link](#)

Sener, M., Levy, S., Christensen, A. J., Patterson, R., Borkiewicz, K., Stone, J.E., Isralewitz, B., Carpenter, J., & Cox, D. (2019). [An accessible visual narrative for the primary energy source of life from the fulldome show Birth of Planet Earth](#). *Supercomputing Scientific Visualization Showcase*. [Link](#)

Borkiewicz, K., Christensen, A. J., Kostis, H.N., Shirah, G., & Wyatt, R. (2019). [Cinematic scientific visualization](#). *ACM SIGGRAPH 2019 Courses on - SIGGRAPH 19*. [DOI Link](#)

- Shih, J. Y., Borkiewicz, K., Christensen, A. J., & Cox, D. (2019). [Interactive cinematic scientific visualization in Unity](#). ACM SIGGRAPH 2019 Posters on - SIGGRAPH 19. [DOI Link](#)
- Borkiewicz, K., Christensen, A. J., Levy, S., Patterson, R., Cox, D., & Carpenter, J. (2018). [Scientific and visual effects software integration for the visualization of a chromatophore](#). SIGGRAPH Asia 2018 Posters on - SA 18. [DOI Link](#)
- Borkiewicz, K., Christensen, A. J., & Stone, J. E. (2017). [Communicating science through visualization in an age of alternative facts](#). SIGGRAPH Asia 2017 Courses on - SA 17. [DOI Link](#)
- Borkiewicz, K., Cox, D., Patterson, R., Levy, S., Christensen, A. J., Carpenter, J. D., O'Shea, B.W., Wise, J.H., Xu, H., & Norman, M.L. (2017). [First Light in the Renaissance Simulation Visualization: Formation of the Very First Galaxies in the Universe](#). SC17 Scientific Visualization Showcase.
- Borkiewicz, K., Cox, D., Patterson, R., Levy, S., Christensen, A. J., Carpenter, J. D., A. J., Goldbaum, N.J., Krumholz, M.R., & Forbes, J.C. (2017). [Milky Way Analogue Isolated Disk Galaxy Visualization](#). SC17 Scientific Visualization Showcase.
- Borkiewicz, K., Christensen, A. J., & Stone, J. E. (2017). [Communicating science through visualization in an age of alternative facts](#). ACM SIGGRAPH 2017 Courses on - SIGGRAPH 17. [DOI Link](#)
- Borkiewicz, K. (2016). [Scientific Data Visualization Accuracy & Big Data: Visualization Design for “Solar Superstorms”](#). International Planetarium Society – IPS. [Link](#)

PRESENTATIONS

Short-form courses at University of Illinois at Urbana-Champaign

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|-------------|--|
| 2022 | IS457: Data Storytelling guest lecturer |
| 2021 | DIGI-MAT NSF research training program guest lecturer |
| 2020 - 2022 | IS590DV: Data Visualization guest lecturer |
| 2020 | 3D Data Visualization for Science Communication , 4 week online course with 3,500 students |
| 2019 - 2020 | ENG177: Engineering First-Year Experience Seminar guest lecturer |
| 2019 | Data Visualization Building Blocks online course guest lecturer |
| 2018 | CS419: Production Computer Graphics guest lecturer |
| 2018 | MACS496: Interactive and Immersive Media guest lecturer |
| 2017 | Scientific Visualization in Houdini webinar with 30,000 views |

Invited Talks

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| 2021 | “Computer Science Careers: Cinematic Scientific Visualization” Taft High School |
| 2021 | “Supercomputers, Big Data, & Scientific Vis.” US National Congress, Theoretical & Applied Mechanics |
| 2021 | “Houdini Presentation” University of Pennsylvania |
| 2020 | “Cinematic Scientific Visualization: Where Science Meets Hollywood Visual Effects” ACM Chicago |
| 2019 | “Conceptualizing a National Geospatial Software Institute” University of Illinois |
| 2019 | “The Art of Communicating Science” University of New South Wales, Sydney, Australia |
| 2019 | “Mind the (Gender) Gap: My Story as a Female Researcher in STEM” Women in Computer Science |
| 2019 | “Making of <i>Birth of Planet Earth</i> ” World Premiere at Zeiss Großplanetarium, Berlin, Germany |
| 2019 | “The Intersection of Hollywood VFX and Supercomputer Science” Wonder & Skepticism, Chicago, IL |
| 2018 | “Making Data Beautiful” Northside College Preparatory High School colloquium, Chicago, IL |
| 2016 | “Being a ‘Woman Engineer’” TEDxUIUC Salon on Women in STEM, University of Illinois |

Conferences & Workshops

- 2022 “Data Visualization for Science Communication” | Research Impact Summit
- 2022 “Houdini by SideFX” | University of Pennsylvania
- 2022 [“Working with Scientific Datasets in Houdini”](#) | Houdini.School
- 2021 “Cinematic Scientific Visualization: Challenges and Technological Opportunities” | NVIDIA GTC
- 2021 “Storytelling with Data” | LSSTC Data Science Fellowship Program workshop
- 2020 “Visualization in Houdini: How to use VFX for a Cinematic Presentation of Science” | IEEE VIS
- 2020 “Visualizing Worlds” moderator | ACM SIGGRAPH
- 2019 “Visualizing *Birth of Planet Earth* for Full-dome Theaters” | ACM SIGGRAPH Asia
- 2019 “Visualizing the Arctic” | ACM SIGGRAPH Asia BOF
- 2018 “Data Visualization in the Era of Alternative Facts” | Broadening Participation in Visualization
- 2018 “Houdini Software for Scientific Visualization” | Broadening Participation in Visualization
- 2018 “Houdini / Ytini Overview” | Data Visualization and Exploration in the LSST Era
- 2018 “Making of Immersive Videos” | IMERSA
- 2017 “Visualization: Choosing Among Multiple Truths” | ACM SIGGRAPH BOF
- 2016 “Science of the Unseen: Digital Art Perspectives” | ACM SIGGRAPH
- 2016 “How the Supercomputer is not just a Render Farm” | ACM SIGGRAPH BOF
- 2015 “Visualization at the NCSA” | ACM SIGGRAPH BOF
- 2014 “Immersive Visualization for Science and Research” | ACM SIGGRAPH BOF

ACHIEVEMENTS

Team Accolades



Additional Film Festival Selections



Personal Certifications and Awards

- 2020-2021 Emerging Women Leaders Program, University of Illinois, nominated and selected participant
- 2018 Certified Usability Analyst (CUA), UX design certification from Human Factors International
- 2016 “Unstumpable Award: For Being Able to Solve Any Problem She is Given” from NCSA
- 2015-pres. IRB Certification for Human Subjects Social and Behavioral Research from CITI Program

Mentored Students' Accomplishments

- 2018-2022 Fiddler Innovation Prizes: Y. Miao, K. Deng, Y. Zhao, K. Haas, C. Santo, C. Wehmeier, Q. Herzig
- 2019 1st Place ACM SIGGRAPH Undergraduate Student Research Competition: Jasmine Shih
- 2018 1st Place UIUC Student Employee of the Year: Dawn Nguyen

PRESS

- 2022 [Kalina Borkiewicz discusses NCSA at SIGGRAPH 2022](#) | HPC Wire
- 2022 [Charting the Future: A Culmination of Work by Industry Legends](#) | Planetarian Magazine
- 2022 [NASA-supported Prototype Turns Earth Data into 3D Video Dashboard](#) | NASA Features
- 2021 [A Life of Its Own](#) | Research Software Engineer Stories Podcast
- 2021 [Science + Art Hip.tv Episode 5](#) | Houdini.School
- 2019 [Why Cinematic Scientific Visualization is More Important than Ever](#) | ACM SIGGRAPH Blog
- 2019 [Imagine the Moon opens at Adler, a gorgeous new sky show](#) | Chicago Tribune
- 2019 [Making Science Accessible](#) | Planetarian Magazine
- 2019 [Birth of Planet Earth Explores the Celestial Events that Prepared Earth to Support Life](#) | Planetarian
- 2018 [Women in Tech Group Awarded Women in High Performance Computing Affiliate Status](#) | HPC Wire
- 2018 [Houdini Connect - Advanced Visualization Lab \(AVL\)](#) | SideFX Stories
- 2018 An Inspiration to Women in Computer Science | The Hoop Beat Northside College Prep newspaper
- 2017 [Bringing Visual Effects Software to Scientists](#) | NCSA Press
- 2016 [TEDxUIUC Showcases Growth of Women in STEM Related Fields](#) | The Daily Illini
- 2016 [Go Figure, UI Edition](#) | The News-Gazette

GRANTS AS PRINCIPAL INVESTIGATOR

- 2021 \$240,000 from Brinson Foundation for research on how design choices affect audiences viewing visualization, and supermassive black hole visualization of data from Nobel laureate Dr. Andrea Ghez
- 2019 \$17,000 from GECAT to kick off international visualization collaboration with U. of New South Wales
- 2015 - 2021 1,500,000 hour allocation on the Blue Waters supercomputer (\$142,335 value)

VOLUNTEERING

- 2022-2023 ACM SIGGRAPH 2023 Electronic Theater Program Chair
- 2021 - pres. Women of SIGGRAPH Conversations (WOSC) program manager
- 2021 NASA Reviewer for grant applications
- 2021 ACM SIGGRAPH Computer Animation Festival Juror
- 2020 - pres. ACM SIGGRAPH Nominations Committee Member
- 2020 Krampusnacht Freeky Film Fest judge
- 2020 ACM SIGGRAPH Asia Technical Communications and Posters committee member
- 2019 - 2021 Chicago Public Schools computer science career speaker
- 2018 ACM SIGGRAPH General Submissions offsite reviewer
- 2018 ACM SIGGRAPH Asia Technical Papers peer reviewer
- 2018 Geospatial Software Institute papers peer reviewer

2017 - 2022 Women@NCSA founder and committee member

2017 - pres. Hyperion Technical Computing Advisory Panelist

2016 - 2019 Diversity in STEM speaker at Champaign Unit 4 Schools

GENERAL INFORMATION

Citizenship USA, Poland

Languages English (fluent), Polish (fluent), Spanish (conversational), American Sign Language (beginner)

Interests Computer graphics, computational photography, computer vision, film production, pipelines, AR, machine learning, UX design, graphic design, science communication, data visualization

Programming C/C++, Python, Java, C#, JavaScript, HTML/CSS, Bash, .NET

Software Houdini, Tableau, yt, Nuke, Unity, 3DS Max, Adobe Premiere Pro, Adobe Photoshop