

Timothy B. Luciani

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Director and research scientist with a PhD in data visualization and 10+ years building analytics platforms at scale. Lead a team of PhD scientists and engineers delivering LLM-driven audience intelligence over petascale marketing data. 15 peer-reviewed publications including 8 journal articles and 3 IEEE TVCG papers; full list at tim.phd.

Skills

AI/ML	RAG, LLM evaluation (LLM-as-a-Judge), retrieval benchmarking, prompt/token optimization, model serving and routing, embedding and clustering models, GPU scheduling, local/quantized inference
Data	Spark, PySpark, Databricks, Hadoop, Airflow, PostgreSQL, ADBC
Platform	AWS (EC2, EKS), Kubernetes, ArgoCD, OpenTelemetry, Okta/SSO, FastAPI, Docker
Frontend	React, TypeScript, D3.js, WebGL, Vitest, Nx
Languages	Python, TypeScript/JavaScript, C++, SQL, CUDA/OpenCL
Leadership	Team leadership and performance management, cross-functional roadmap ownership, data governance and compliance, executive communication, technical hiring and mentorship

Experience

Publicis Groupe – Epsilon

Chicago, IL

DIRECTOR, VISUAL ANALYTICS – DECISION SCIENCES

July 2019 – Present

- Promoted three times across four roles in four years: Data Visualization Scientist (Jul 2019) → Senior Data Visualization Scientist → Associate Director → Director (Jul 2023)
- Lead DSVA Systems, a team of 4–5 (three PhD research scientists, one data engineer, seasonal intern) as one of three pod leads reporting to the VP of Decision Sciences, Visual Analytics (DSVA), helping to architect DiME — a visual storytelling platform that turns petascale marketing data into data-rich narratives, used to show prospective clients how Epsilon can reach their customers and lift return on ad spend.
- Grew platform adoption +93% total users, +64% unique users, and +85% unique companies year over year (2024 vs. 2023), driven by third-party data integration (TxSpend, IRI, Circana) spanning 1,400+ companies and 8,500+ audiences, and by extending DiME into adjacent Publicis products via Okta SSO.
- Platform-generated narratives and personas drove creative ideation on a competitive new-business pitch, in partnership with Epsilon's creative team, contributing to a Fortune 500 retail account win, which has become our platform's core use case.
- Direct my pods's LLM-assisted work: retrieval-augmented generation over proprietary marketing data, shipped to users as conversational persona exploration, on a shared LLM proxy with Databricks-based model management. Built the internal evaluation layer behind it — LLM-as-a-Judge harnesses, retrieval-quality benchmarking, and production response-quality monitoring, enabling continuous assessment of deployments rather than release-gated review.
- Established AI adoption practice for the department: helped author my team's AI adoption roadmap and tracking wiki, set usage guidance across Decision Sciences, and report adoption saturation findings to leadership. Serve on the Decision Sciences AI Steering Committee.
- Rebuilt the data platform for scale: NLRR v2 from ad-hoc SQL prototype to production Spark, now computing 500+ companies monthly and consumed by Audience Lab and Publicis Discovery; PySpark post-processing migration; PostgreSQL hash-join and indexing optimization; Databricks migration for core processing workloads.
- Own infrastructure and compliance for the platform: EC2/EKS, Kubernetes with ArgoCD, PostgreSQL 17 upgrades, and the only GPU-scheduled Airflow deployment in Decision Sciences Visual Analytics (7 GPU servers). Led the CA-DROP data-governance initiative end to end — audit, remediation planning, and verified closure across all production environments — sustaining 99.9% uptime throughout.

University of Illinois at Chicago, Electronic Visualization Lab

Chicago, IL

GRADUATE RESEARCH ASSISTANT

August 2017 – June 2019

- Investigated patient cohort similarity based on spatial descriptors.

National Science Foundation (GRFP)

Pittsburgh, PA / Chicago, IL

GRADUATE RESEARCH FELLOW

January 2012 – August 2017

- Conducted large-scale data visualization research for interdisciplinary domains across a 5-year fellowship spanning the University of Pittsburgh and University of Illinois at Chicago.

General Dynamics - Mission Systems | Viz

Pittsburgh, PA

LEVEL 2 SOFTWARE ENGINEER

July 2014 – May 2017

- Co-architected mission-critical software enabling emergency response coordinators to manage resources in real time, across both crisis and routine operations.
- Architected the next-generation, in-house charting and visualization framework, replacing legacy tooling used across the team.

University of Pittsburgh

UNDERGRADUATE RESEARCH ASSISTANT

- Worked with researchers in Astronomy and Physics disciplines to develop tools for visualizing large-scale data
- Worked with new web-technologies such as WebGL and HTML5
- Built upon existing code bases using CUDA/OpenCL to create faster visualizations.

Pittsburgh, PA

May 2011 - December 2011

Education

University of Illinois at Chicago, Electronic Visualization Laboratory

Chicago, IL

PH.D., COMPUTER SCIENCE (DATA VISUALIZATION)

2019

- Thesis: *Problem-Driven Design Strategies for Scientific Data Visualization*
- Doctoral study at University of Pittsburgh (2012–2014) and Brown University (2014–2015); each transfer followed a change in doctoral advisor

Dietrich School of Arts and Sciences, University of Pittsburgh

Pittsburgh, PA

B.S. IN COMPUTER SCIENCE

August 2008 – December 2011

- Emphasis: Mathematics, Physics
- Graduated Cum Laude

Honors & Awards

2018	Invited Participant, Dagstuhl Seminar 18442: Visualization and Processing of Anisotropy in Imaging, Geometry & Astronomy	Dagstuhl, DE
2017	IEEE Visual Analytics Science and Technology (VAST) Challenge, MC2 , IEEE Vis Conference	Phoenix, AZ
2017	IEEE Visual Analytics Science and Technology (VAST) Challenge, MC3 , IEEE Vis Conference	Phoenix, AZ
2016	Student Volunteer of the Year Award , IEEE Vis Conference	Baltimore, MD
2016	Honorable Mention , IEEE Vis Conference: VGTC VPG Data Visualization Contest	Baltimore, MD
2016	Cover art of JIST January/February 2016 issue , Journal of Imaging Science and Technology	
2013	Data Contest Visualization Award , IEEE BioVis Conference Data Contest	Atlanta, GA
2012	Best-Paper Runner-Up , IEEE Large-Scale Data Analysis and Visualization Conference	Seattle, WA
2012	National Science Foundation Graduate Research Fellowship Program Recipient , NSF	
2012	Winner , University of Pittsburgh, CS Dept. Digital Media Contest	Pittsburgh, PA

Publications

ONCOLOGY, PRECISION MEDICINE & RADIATION THERAPY

- J8** A. Wentzel, T. Luciani, L. van Dijk, N. Taku, B. Elgohari, A.S.R. Mohamed, G. Canahuate, C.D. Fuller, D. Vock, G.E. Marai. "Precision association of lymphatic disease spread with radiation-associated toxicity in oropharyngeal squamous carcinomas", *Radiotherapy and Oncology*, vol. 161, pp. 152–158, Elsevier, June 2021. doi:10.1016/j.radonc.2021.06.016
- J7** T. Luciani, A. Wentzel, B. Elgohari, H. Elhalawani, A.S. Mohamed, G. Canahuate, D.M. Vock, C.D. Fuller, G.E. Marai. "A Spatial Neighborhood Methodology for Computing and Analyzing Lymph Node Carcinoma Similarity in Precision Medicine", *Journal of Biomedical Informatics: X*, vol. 5, art. 100067, Mar. 2020. doi:10.1016/j.yjbinx.2020.100067
- J6** A. Wentzel, P. Hanula, T. Luciani, B. Elgohari, H. Elhalawani, G. Canahuate, D. Vock, C.D. Fuller, G.E. Marai. "Cohort-based T-SSIM Visual Computing for Radiation Therapy Prediction and Exploration", *IEEE Transactions on Visualization and Computer Graphics*, vol. 26, no. 1, pp. 949–959, 2020. doi:10.1109/TVCG.2019.2934546
- P10** T. Luciani, B. Elgohari, H. Elhalawani, A.S. Mohamed, G. Canahuate, D. Vock, C.D. Fuller, G.E. Marai. "Correlating Toxicity Outcomes with Spatial Patterns of Lymph Node Metastasis for Oropharyngeal Cancer Patients". *ASTRO Annual Meeting of the American Society for Radiation Oncology*, Chicago, IL, Sept. 2019.
- P7** A. Wentzel, P. Hanula, T. Luciani, B. Elgohari, H. Elhalawani, G. Canahuate, D. M. Vock, C.D. Fuller, G.E. Marai. "Cohort-Based Spatial Similarity can Predict Radiotherapy Dose Distribution". *American Society for Radiation Oncology*, Chicago, IL, USA. Sept. 2019.

TURBULENT COMBUSTION & TENSOR FIELD VISUALIZATION

- J5** T. Luciani, A. Burks, C. Sugiyama, J. Komperda, 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, vol. 25, no. 01, pp. 1–11, Jan. 2019.
- B2** M. Monfort, T. Luciani, J. Komperda, B. Ziebart, F. Mashayek, G.E. Marai, "Deep learning features of interest from turbulent combustion tensor fields", Modeling, Analysis, and Visualization of Anisotropy. 2017.
- J3** G. E. Marai, T. Luciani, A. Maries, S.L. Yilmaz, M.B. Nik, "Visual Descriptors for Dense Tensor Fields in Computational Turbulent Combustion: A Case Study", Journal of Imaging Science and Technology, vol 60, no 1, Jan. 1, 2016.
- B1** A. Maries, T. Luciani, P.H. Pisciuneri, M.B. Nik, S.L. Yilmaz, P. Givi, G.E. Marai, "A Clustering Method for Identifying Regions of Interest in Turbulent Combustion Tensor Fields", Visualization and Processing of Higher Order Descriptors for Multi-Valued Data. Editors: Ingrid Hotz and Thomas Schultz, Springer, pp. 1–18, 2015.
- P4** 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, 2016.
- P3** T. Luciani, A. Maries, M. Nik, S.L. Yilmaz, "Visualization of Tensor Quantities Used in Computational Turbulent Combustion", 66th Annual Meeting of the APS Division of Fluid Dynamics, Nov., 2013.
- P2** T. Luciani, A. Maries, H. Tran, M. Nik, S.L. Yilmaz, G.E. Marai, "A Novel Method for Tracking Tensor-based Regions of Interest in Large-Scale, Spatially-Dense Turbulent Combustion Data", IEEE Visualization 2012, Poster Abstracts with System Demonstration, pp. 1-2, Oct. 2012.

COMPUTATIONAL BIOLOGY & BIOINFORMATICS

- J4** C. Ma, T. Luciani, A. Terebus, J. Liang, and G. E. Marai. "PRODIGEN: Visualizing the Probability Landscape of Stochastic Gene Regulatory Networks in State and Time Space." BMC Bioinformatics. Feb. 2017. *(Presented at BioVis 2016)*
- C5** C. Ma, T. Luciani, A. Terebus, J. Liang, and G. E. Marai. "PRODIGEN: Visualizing the Probability Landscape of Stochastic Gene Regulatory Networks in State and Time Space," pp 1-13, IEEE BioVis 2016. *(also published as J4)*
- J2** T. Luciani, J. Wenskovitch, K. Chen, D. Koes, T. Travers, G.E. Marai. "FixingTIM: Interactive Exploration of Sequence and Structural Data to Identify Functional Mutations in Protein Families", BMC Bioinformatics, Aug. 2014.
- C3** J. Wenskovitch, T. Luciani, K. Chen, G.E. Marai. "FixingTIM: Identifying Functional Mutations in Protein Families through the Interactive Exploration of Sequence and Structural Data", IEEE BioVis 2013 Data Competition, pp. 1–4, Oct. 2013. **Data Contest Visualization Award.** *(Invited to J2).*

ASTRONOMY & LARGE-SCALE DATA VISUALIZATION

- J1** T. Luciani, B. Cherinka, D. Oliphant, S. Myers, W.M. Wood-Vasey, A. Labrinidis, G.E. Marai. "Large-Scale Overlays and Trends: Visually Mining, Panning and Zooming the Observable Universe", IEEE Transactions on Visualization and Computer Graphics, pp. 1-12, July 2014.
- C2** T. Luciani, S. Myers, B. Sun, B. Cherinka, W.M. Wood-Vasey, A. Labrinidis, G.E. Marai. "Panning and Zooming the Observable Universe with Prefix-Matching Indices and Pixel-Based Overlays", IEEE Large-scale Data Analysis and Visualization Symposium, pp. 1-8, Oct. 2012. **Best-Paper Runner-Up Award.** *(expanded into J1).*
- C1** P. Neophytou, R. Gheorghiu, R. Hachey, T. Luciani, B. Sun, A. Labrinidis, G.E. Marai, P.K. Chrysanthis. "AstroShelf: Understanding the Universe through Scalable Navigation of a Galaxy of Annotations", SIGMOD 2012 Demonstrations Comp.
- P1** T. Luciani, R. Hachey, D.Q. Oliphant, B.A. Cherinka, G.E. Marai. "Pixel-based Overlays for Navigating a Galaxy of Observations". IEEE Visualization 2011 Large-Scale Data Analysis and Visualization Symposium Poster Compendium, Oct. 2011.

URBAN, SOCIAL & GEOSPATIAL ANALYTICS

- C4** 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, Baltimore, MD, USA, Oct. 2016.
- P9** 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. **VAST Challenge Honorable Mention (MC2)** in competition with 56 submissions from teams in academia, industry, and government.
- P8** 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. **VAST Challenge Honorable Mention (MC3)** in competition with 56 submissions from teams in academia, industry, and government.
- P6** 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.
- P5** T. Luciani, C. Ma, J. Trelles, and G. E. Marai. "Developing a Data-Driven Wiki of Spatial-Nonspatial Integration Tools". In Proceedings of the IEEE VIS 2016 Workshop on Creation, Curation, Critique and Conditioning of Principles and Guidelines in Visualization (C4PGV), Baltimore, MD, USA, Oct. 2016.

Invited Presentations

A Deep Learning Approach to Identifying Shock Locations in Turbulent Combustion Tensor Fields

Dagstuhl, Germany

DAGSTUHL SEMINAR 18442: VISUALIZATION AND PROCESSING OF ANISOTROPY IN IMAGING, GEOMETRY, AND ASTRONOMY

Oct. 2018

- Presented proof-of-concept work on deep learning approaches in computational fluid dynamics; abstract published in *Dagstuhl Reports*, vol. 8, no. 10, pp. 148–172, doi:10.4230/DagRep.8.10.148

Developing a Data-Driven Wiki of Spatial-Nonspatial Integration Tools

Baltimore, MD

IEEE VIS 2016 WORKSHOP ON CREATION, CURATION, CRITIQUE AND CONDITIONING OF PRINCIPLES AND GUIDELINES IN VISUALIZATION (C4PGV)

Oct. 2016

- Presented current efforts at organizing our survey into a public electronic repository

66th Annual Meeting of the APS Division of Fluid Dynamics

Pittsburgh, PA

VISUALIZATION OF TENSOR QUANTITIES USED IN COMPUTATIONAL TURBULENT COMBUSTION

Nov. 2013

- Presented past research on flow visualization techniques

Allegheny Observatory Public Lecture Series

Pittsburgh, PA

PANNING AND ZOOMING THE OBSERVABLE UNIVERSE WITH PREFIX-MATCHING INDICES AND PIXEL-BASED OVERLAY

July 2013

- Presented current astronomy research on visual trends in spectral data

Technology Leadership Initiative Workshop

Pittsburgh, PA

INTRODUCTION TO ANIMATION AND VIDEO GAMES TUTORIAL

May 2013

- Taught Technology Leadership Initiative Workshop (TLIW) to 20 high school students

IEEE Large-scale Data Analysis and Visualization (LDAV) Conference

Seattle, WA

PAPER TRACK

Oct. 2012

- Presented paper entry (C2) at the annual conference

Pittsburgh Science and Technology Academy

Pittsburgh, PA

SciTECH SCIENCE FORUM

Jan. 2012

- Presented research in data visualization to high school students to promote interest in CS

All-Wavelength Extended Groth Strip International Survey (AEGIS)

PITTSBURGH CONFERENCE

- Presented astronomy research to AEGIS community for feedback during their annual conference

Pittsburgh, PA

June 2011

Leadership & Service

2026	Member , Decision Sciences AI Steering Committee	<i>Chicago, IL</i>
2020	Chair , IEEE VIS Student Volunteer Program	<i>Salt Lake City, UT</i>
2019	Chair , IEEE VIS Student Volunteer Program	<i>Vancouver, BC, CA</i>
2018	Chair , IEEE VIS Student Volunteer Program	<i>Berlin, Germany</i>
2013	Vice-President , University of Pittsburgh, Graduate Student Organization	<i>Pittsburgh, PA</i>