Timothy B. **Luciani**

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Experience

Publicis Group - Epsilon
Chicago, IL

Director, Visual Analytics Scientist, Decision Sciences
July 2019 - Current

- Manage a small team of data scientists and engineers who specialize in peta-scale data visualization of digital marketing data, translating complex information into comprehensible, actionable insights.
- Create innovative visual analytic systems that reveal, explore and explain complex patterns and phenomena from Epsilon's peta-scale and massively-dimensional digital marketing ecosystem.
- Reduce data complexity into sophisticated, interactive visual metaphors and stories that demonstrate the business value of Epsilon's platform directly to our stakeholders and global customers.
- Implement and maintain a robust production system used across the team.

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
Chicago, IL

Graduate Research Fellow
August 2015 - August 2017

- Continued research in large-scale data visualization for interdisciplinary domains.

General Dynamics - Mission Systems | Viz
Pittsburgh, PA

Level 2 Software Engineer
July 2014 - May 2017

- Co-authored software for emergency response coordinators to manage resources in real-time in both times of crisis and routine operation
- Architected the next-generation, in-house charting and visualization framework.

National Science Foundation
Pittsburgh, PA

Graduate Research Fellow
January 2012 - July 2014

- Continued research in large-scale data visualization for interdisciplinary domains.

University of Pittsburgh
Pittsburgh, PA

Undergraduate Research Assistant
May 2011 - December 2011

- 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.

Education

University of Illinois at Chicago, Electronic Visualization Laboratory
Chicago, IL

Ph.D.in Computer Science, emph. Data Visualization
August 2015 - May 2019

- Thesis topic: *Problem-Driven Design Strategies for Scientific Data Visualization*
- **Cumulative GPA**: 3.9

Dietrich School of Arts and Sciences, University of Pittsburgh
Pittsburgh, PA

Ph.D.in Computer Science
January 2012 - April 2014

- Focus on real-time GPGPU rendering and large-scale data for interdisciplinary visualizations and applications
- Transferred to University of Illinois at Chicago
- **Cumulative GPA**: 3.688

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
- **Cumulative GPA**: 3.5 (in major)

Honors & Awards

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

Book Chapters

B3 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.

B2 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.

Journal Publications

J7 A. Wentzel et al., ”Cohort-based T-SSIM Visual Computing for Radiation Therapy Prediction and Exploration,” in IEEE Transactions on Visualization and Computer Graphics, vol. 26, no. 1, pp. 949-959, Jan. 2020

J6 T.Luciani, A.Wentzel, B.Elgohari, H.Elhalawani, A.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, vol. 112, 2020.

J5 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 01, pp. 949-959, 2019.

J4 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.

J3 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)*

J2 T. Luciani, J. Wenskovitch, K. Chen, D. Koes, T. Travers, G.E. Marai. “FixingTIM: FixingTIM: Interactive Exploration of Sequence and Structural Data to Identify Functional Mutations in Protein Families” BMC Bioinformatics, Aug. 2014.

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.

Conference Publications

C6 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 Scientific Visualization Conference, Vancouver, BC, CA, Oct. 2019. Under Review

C5 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, pp. 1–10, Oct. 2018. *(cross-listed as J5 above*)

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. *(cross-listed as J3 above)*

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.

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)*.

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.

Peer-reviewed Conference Short Papers, Abstracts and System Demonstrations

P10 T. Luciani, B. Elgohari, H. Elhalawani, G. Canahuate, D. M. Vock, C.D. Fuller, G.E. Marai. "Correlating Toxicity Outcomes with Spatial Patterns of Lymph Node Metastasis for Oropharyngeal Cancer Patients". American Society for Radiation Oncology, Chicago, IL, USA. Sept. 2019.

P9 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.

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.

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.

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", 66 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.

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.

Invited Presentations

A Deep Learning Approach to Identifying Shock Locations in Turbulent Combustion Tensor Fields — *Dagstuhl, Germany*

Dagstuhl 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

Developing a Data-Driven Wiki of Spatial-Nonspatial Integration Tools — *Baltimore, MD*

Visualization of Tensor Quantities Used in Computational Turbulent Combustion — *Oct. 2016*

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

6th 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 (C3) 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, PA*

Pittsburgh Conference — *June 2011*

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

Committees

2020	**Chair**, IEEE VIS Student Volunteer Program	*Salt Lake City, UT*
2019	**Chair**, IEEE VIS Student Volunteer Program	*Vancouver, BC, CA*
2018	**Chair**, IEEE VIS Student Volunteer Program	*Berlin, Germany*
2013	**Vice-President**, University of Pittsburgh, Graduate Student Organization	*Pittsburgh, PA*