David A. Lattanzi, Ph.D., P.E.

Assistant Professor, Sid and Reva Dewberry Department of Civil, Environmental, and Infrastructure Engineering

George Mason University, Fairfax, VA 22030

E: dlattanz@gmu.edu P: (703) 993-3695 W: http://lrg.gmu.edu

I. PERSONAL INFORMATION

A. Education

Ph.D.	Structural Engineering, University of Washington	2013
M.S.	Mechanical Engineering, University of Washington	2013
M.S.	Structural Engineering, Tufts University	2005
B.S.	Civil Engineering, Tufts University	2005

B. Experience

i. Academic

Assistant Professor, George Mason University — 2013-present
Dept. of Civil, Environmental, and Infrastructure Engineering

Research Assistant, University of Washington — 2009-2013
Dept. of Civil & Environmental Engineering

ii. Professional

Chief Technical Officer, Arcus Analytics — 2016-present
Fairfax, VA

Bridge Engineer, Gannett Fleming — 2005-2009
Pittsburgh, PA

Assistant Structural Engineer, Dewberry, Inc. — 2004-2005
Boston, MA

C. Licensure

Professional Engineer (P.E.), Commonwealth of Pennsylvania
License Number: PE076478

II. RESEARCH ACTIVITIES

A. Publications and Presentations

i. Dissertation

" A computational framework for next-generation inspection imaging," Ph.D., University of Washington, June 2013; Advisor: Gregory Miller.

ii. Refereed journal publications *(underlined student co-authors)*

[9] A. Khaloo and **D. Lattanzi**, "Motion corrected and dense structural motions from repurposed videos," *Structural Control & Health Monitoring,* Wiley, 2017 (accepted).

[8] **D. Lattanzi** and G. Miller, "Robotic infrastructure inspection systems: a summary review," ASCE, 2016 (accepted).

[7] A. Khaloo and **D. Lattanzi**, "Hierarchical dense structure-from-motion reconstructions for infrastructure condition assessment," *Journal of Computing in Civil Engineering*, ASCE, 2016.

[6] **D. Lattanzi**, G. Miller, M. Eberhard, and O. Haraldsson, "Bridge column maximum drift estimation via computer vision," *Journal of Computing in Civil Engineering*, ASCE, 2015.

[5] G. Urgessa, **D. Lattanzi**, and M. Casey, "Stability of large reinforcing column cages during temporary construction conditions," *Practice Periodical on Structural Design and Construction,* ASCE, 2015.

[4] **D. Lattanzi** and G. Miller, "3D scene reconstruction for robotic bridge inspection," *Journal of Infrastructure Systems*, ASCE, 2014.

[3] **D. Lattanzi** and G. Miller, "Robust automated concrete damage detection algorithms for field applications," *Journal of Computing in Civil Engineering*, ASCE, 2012.

[2] P. Obrien, M. Eberhard, O. Haraldsson, A. Irfanoglu, **D. Lattanzi**, S. Lauer, and S. Pujol, "Measures of the seismic vulnerability of reinforced concrete buildings in Haiti," *Earthquake Spectra*, EERI, 2011.

[1] B. Brenner, M. Sanayei, **D. Lattanzi**, and E. Bell, "Evaluation of highway bridge strength considering parapets," *Bridge Structures*, Taylor & Francis, 2005.

Submitted:

[1] A. Bapu and **D. Lattanzi**, "A machine learning approach to bridge structure prototyping," (In review at *Advanced in Engineering Software*).

[2] A. Khaloo, **D. Lattanzi,** K. Cunningham, M. Riley, and R. Dell'Andrea. "Inspection of the Placer River Trail Bridge using an unmanned aerial vehicle," (In review at *Structure & Infrastructure Engineering).*

In Preparation:

[1] A. Khaloo and **D. Lattanzi**, "Robust normal estimation and region growing segmentation of infrastructure 3D point clouds," (*Anticipated submission in March 2017*).

[2] B. Jafari, A. Khaloo and **D. Lattanzi**, "Deformation tracking in 3D point clouds via statistical sampling of cloud-to-cloud distances," (*Anticipated submission in March 2017*).

iii. Refereed conference proceedings

[7] B. Jafari, A. Khaloo and **D. Lattanzi**, "Tracking structural deflections via sample-based point cloud analysis," *International Workshop on Computing in Civil Engineering*, ASCE, 2017.

[6] A. Khaloo and **D. Lattanzi**, "Robust outlier detection and normal estimation in noisy infrastructure 3D point clouds," *International Workshop on Computing in Civil Engineering*, ASCE, 2017.

[5] A. Jootoo and **D. Lattanzi**, "Hybridizing topology optimization and evolutionary computation to support computer-aided engineering design," *International Workshop on Computing in Civil Engineering*, ASCE, 2017.

[4] K. Ghahremani, A. Khaloo, and **D. Lattanzi**, "Automated 3D Image-Based Section Loss Detection for Finite Element Model Updating," *International Symposium on Automation and Robotics in Construction*, 2016.

[3] A. Jootoo and **D. Lattanzi**, "A hybrid machine learning and optimization based approach to bridge design," *International Conference on Computing in Civil and Building Engineering*, 2016.

[2] A. Khaloo and **D. Lattanzi**, "A hierarchical computer vision approach to infrastructure inspection," *International Workshop on Computing in Civil Engineering*, ASCE, 2015.

[1] **D. Lattanzi** and G. Miller, "A computational framework for next generation bridge inspection," *Joint Conference on Computer Vision, Imaging, and Computer Graphics Theory and Applications*, 2012.

iv. Abstract reviewed conference proceedings

[8] A. Khaloo and **D. Lattanzi**, "Exploring computer vision inspection techniques through data mining of the visual NEESHub," *International Conference on Sustainable Design, Engineering, and Construction*, 2016.

[7] A. Jootoo and **D. Lattanzi**, "A machine learning approach to bridge prototyping," *International Conference on Sustainable Design, Engineering, and Construction*, 2016.

[6] B. Jafari, A. Khaloo and **D. Lattanzi**, "Long-term monitoring of structures through 3D point cloud analysis," *Proceedings of SPIE: Smart Structures and Nondestructive Evaluation*, SPIE, 2016.

[5] A. Khaloo and **D. Lattanzi**, "Repurposing video recordings for structure motion estimations," *Proceedings of SPIE: Smart Structures and Nondestructive Evaluation*, SPIE, 2016.

[4] A. Khaloo and **D. Lattanzi**, "Extracting structural models through computer vision," *Proceedings of the Structures Congress*, ASCE, 2015.

[3] K. Cunningham, **D. Lattanzi**, R. Dell'Andrea, M. Riley, T. Huette, R. Goetz, and R. Wilson, "UAS-based inspection of the Placer River Trail Bridge: a data-driven approach," *Proceedings of the Structures Congress,* ASCE, 2015.

[2] **D. Lattanzi** and G. Miller, "A prototype imaging and visualization system for robotic infrastructure inspection," *Proceedings of the Structures Congress*, ASCE, 2013.

[1] B. Brenner, M. Sanayei, **D. Lattanzi**, and E. Bell, "Defining a baseline model for bridge analysis and design," *Proceedings of the Transportation Research Board*, 2006.

v. Invited presentations

[12] The American Society of Civil Engineers, "Human-machine interaction and the future of civil engineering," February 16, 2017.

[11] Structural Engineering Institute-Pittsburgh Chapter, "Human-machine interaction and the future of structural engineering," January 17, 2017.

[10] The Transportation Research Board, "Integrating UAVs and photogrammetry to support bridge inspections," January 11, 2017.

[9] The American Society of Highway Engineers National Conference, "Unmanned aerial vehicles with applications in bridge inspection and surveying," May 20, 2016.

[8] With Good Reason Radio, "Reaching the End of a Bridge's Lifespan", April 30, 2016.

[7] The University of Virginia Civil & Environmental Engineering Department Seminar Series, "Human-machine interaction and the future of robotics in civil engineering," March 18, 2016.

[6] Krasnow Institute, "Connecting imaging and computational mechanics through computer vision," February 8, 2016.

[5] The American Society of Photogrammetry and Remote Sensing, "Placer River Trail Bridge inspection using small unmanned aircraft systems," September 24, 2015.

[4] Turner-Fairbank Highway Research Center: "Automating the analysis of NDE data," May 18, 2015.

[3] Academy of Science and Engineering: "Robotic bridge inspection: A needle in a haystack problem," May 27, 2014.

[2] National Institute of Standards and Technology: "Virtualized bridge inspection," April 30, 2014.

[1] Transportation Research Board Annual Meeting: "Inspection robotics: challenges and opportunities," January 14, 2014.

vi. Patents

[1] **D. Lattanzi** and A. Khaloo. A multi-scale method of generating 3D civil site surveys. Utility patent filed July 15, 2016.

B. Contracts and grants

[7] ***Office of Naval Research***

ONR Summer Faculty Research Program

Start date: June 1st, 2017, three-month duration

PI: David Lattanzi

Total awarded: $14,000

[6] ***National Science Foundation***

Project title: "I-Corps: Bringing Digital Twin Technology to the Asset Management Community"

Start date: December 1st, 2016, six-month duration

PI: David Lattanzi

Total awarded: $50,000

[5] ***Office of the Provost, George Mason University***

Project title: "Assessing Emergent Risks in Interdependent Transportation and Communication Systems"

Start date: August 1st, 2016, one year duration

PI: David Lattanzi

Total awarded: $25,000 (Lattanzi share: $4,500)

[4] ***Jeffress Trust Award in Interdisciplinary Research***

Project title: "Connecting 3D imaging and computational mechanics for next-generation civil infrastructure assessment"

Start date: June 30th, 2016, one year duration

PI: David Lattanzi

Total: $100,000

[3] ***U.S. Department of Agriculture, U.S. Forest Service***

Project title: "UAV Inspection of the Placer River Trail Bridge"

Start date: June 6th, 2015, one year duration

PI: David Lattanzi

Total awarded: $36,867

[2] ***National Science Foundation***

Project title: "Comprehensive Structural Assessments Through Hierarchical Computer Vision"

Start date: August 1st, 2014, three-year duration

PI: David Lattanzi

Total awarded: $264,942

[1] ***4-VA Foundation***

Project title: "Bringing 3D Printing Into the Engineering Classroom"

Start date: June 1st, 2014, two-year duration

PI: David Lattanzi. Co-PI: Laura Kosoglu (George Mason University)

Total awarded: $30,530 (Lattanzi share: $23,530)

Pending support (Total: $508,459)

[1] ***Office of Naval Research***

Project title: "Semantically Rich Life-Cycle Modeling for Naval Survey Assessments"

PI: David Lattanzi

Total: $508,459

III. TEACHING AND ADVISING

A. Courses taught over last 5 years

[1] **CEIE 310: Mechanics of Materials**

Student evaluation				
Term	**Instructor rating**	**Dept. mean**	**Course rating**	**Dept. mean**
Fall 2013	3.78/5.0	4.32/5.0	3.84/5.0	4.24/5.0
Fall 2014	4.78/5.0	4.51/5.0	4.49/5.0	4.35/5.0
Spring 2015	4.79/5.0	4.50/5.0	4.52/5.0	4.35/5.0
Fall 2015	4.84/5.0	4.50/5.0	4.51/5.0	4.39/5.0

[2] **CEIE 612: Structural Mechanics**

Student evaluation				
Term	**Instructor rating**	**Dept. mean**	**Course rating**	**Dept. mean**
Spring 2014	4.88/5.0	4.35/5.0	4.75/5.0	4.24/5.0
Fall 2015	4.85/5.0	4.50/5.0	4.62/5.0	4.39/5.0

[3] **CEIE 620: Intelligent Structural Systems**

Student evaluation				
Term	**Instructor rating**	**Dept. mean**	**Course rating**	**Dept. mean**
Fall 2014	4.77/5.0	4.51/5.0	4.67/5.0	4.35/5.0
Spring 2016	4.67/5.0	4.52/5.0	4.83/5.0	4.40/5.0

B. Advising

Ph.D.

Ali Khaloo

Thesis: Finite element model updating through computer vision

(Expected Spring 2018)

Achyuthan Bapu
Thesis: A multi-stage machine learning approach to structural design
(Expected Spring 2018)

Sara Mohammadi
Thesis: Nonlinear finite element model updating through 3D point cloud analytics
(Expected Spring 2020)

M.S.

Bahman Jafari
Thesis: Measuring mechanical deformations through 3D point cloud analysis
Graduated Summer 2016

Affan Khan
Thesis: Finite element modeling through point cloud analytics
Graduated Fall 2016

Post-doctoral

Kasra Ghahremani
Topic: Metal section loss estimation through differential 3D imaging

Undergraduate research

Terrence Moran "Noncontact evaluation of corrosion through image analysis"
Funding from GMU OSCAR Program
Fall 2017

Richard Mayo "Section loss estimation of bridges"
Funding from GMU OSCAR Program
Spring 2016

Jeffrey Bynum "Mechanical properties of fused deposition manufactured thermoplastics"
Funding from 4-VA Program
Summer 2014, Fall 2014, and Spring 2015

Jeffrey Bynum "Fusing digital imaging and embedded sensor network information"
Funding from National Science Foundation
Summer 2015

Jared Keller "Unmanned aerial vehicles for bridge inspections"
Funding from GMU OSCAR Program
Fall 2014 and Spring 2015

C. Thesis committee membership

Robert Sobeski, Ph.D., Civil Engineering (GMU)
Wondwoosen Ali, Ph.D., Civil Engineering (GMU)
Raven Russell, Ph.D., Computer Science (GMU)

IV. SERVICE

A. Professional

i. Membership in professional organizations

American Society of Civil Engineers (ASCE)

Structural Engineering Institute (SEI)

American Society of Photogrammetry and Remote Sensing (ASPRS)

International Society for Optics and Photonics (SPIE)

International Association for Automation and Robotics in Construction (IAARC)

ii. Committee memberships

Member – SEI Methods of Monitoring Structural Performance Committee

Member – ASCE Data Sensing and Analysis Committee

Member – International Workshop on Computing in Civil Engineering Technical Committee

iii. Reviewing activities:

Review Editor, *Frontiers in Structural Sensing*

Reviewer for *Computer-Aided Civil and Infrastructure Engineering*

Reviewer for *IEEE Transactions on Automation Science and Engineering*

Reviewer for *IEEE Transactions on Geoscience and Remote Sensing*

Reviewer for *Structure & Infrastructure Engineering*

Reviewer for *Robotics and Computer Integrated Manufacturing*

Reviewer for *Artificial Intelligence for Engineering Design, Analysis, and Manufacturing*

National Science Foundation, CMMI Division, 2014

National Science Foundation, CMMI Division, 2015

B. University

CEIE 795 & 800 seminar series coordinator, Fall 2014 and Spring 2015 (Department)

Member of the engineering library committee, Fall 2013-present (VSE)

Hazel Chair search committee member, 2014-2016 (Department)

Department Chair search committee member, 2016-2017 (Department)