

JULIÁN NORATO

School of Mechanical, Aerospace, and Manufacturing Engineering
University of Connecticut
191 Auditorium Road, U-3139, Storrs, CT, 06269

☎ +1 (860) 486-2345
✉ julian.norato@uconn.edu
🌐 <https://sol.engr.uconn.edu>

PRESENT POSITION

Associate Professor (Aug 2020–Present) and **Director of Graduate Studies** (Aug. 2022–Present)
School of Mechanical, Aerospace, and Manufacturing Engineering, University of Connecticut
Assistant Director, Digital Design Research, Analysis and Manufacturing (DREAM) Center

ACADEMIC BACKGROUND

EDUCATION

PhD in Mechanical Engineering with Specialization in Computational Science and Engineering, University of Illinois at Urbana-Champaign, 2005

MS in Mechanical Engineering with Specialization in Computational Science and Engineering, University of Illinois at Urbana-Champaign, 2003

BS in Mechanical Engineering, Universidad Nacional de Colombia, Colombia, 1997

HONORS AND AWARDS

Ranked in Stanford/Elsevier's Top 2% Scientist Rankings for 2023

ASME Fellow, 2024

Castleman Professorship in Engineering Innovation at University of Connecticut, 2022–2025

2022 Associate Editor Award, ASME Journal of Mechanical Design

Invited participant to German-American Frontiers of Engineering Symposium co-organized by National Academy of Engineers and Humboldt Foundation, 2021

ASME Design Automation Young Investigator Award, 2019

NSF CAREER Award, CMMI Division / EDSE Program, 2018

Office of Naval Research Young Investigator Award, 2017

ME Early Career Faculty Scholar Award, 2017

Caterpillar's Move the Mountain Award, 2014

Danish Center for Applied Mathematics and Mechanics Grant for doctoral summer course, 2002

General Scholarship for Graduate Studies Overseas, The Foundation for the Future of Colombia (COLFUTURO), 1999

GUEST APPOINTMENTS

- Instructor, Summer Course on Topology Optimization for Mechanical Design, Universidad de Los Andes, Colombia, *Jun. 2025–Jul. 2025*
- Guest Associate Professor, Technical University of Denmark, *May 2024–Jun. 2024*
- Guest Associate Professor, Technical University of Denmark, *Apr. 2023–Aug. 2023*
- Air Force Research Lab Summer Faculty Fellow, *May 2021–Jul. 2021*.
- Air Force Research Lab Summer Faculty Fellow, *May 2020–Jul. 2020*.
- Visiting Lecturer, Dept. of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, *Jan. 2014–May 2014*.

INSTITUTIONAL AFFILIATIONS AT UCONN

- Digital Design Research, Analysis and Manufacturing (DREAM) Center
- Institute of Materials Science (IMS)
- National Institute for Undersea Vehicle Technology (NIUVT)
- Krenicki Arts & Engineering Institute

PROFESSIONAL EXPERIENCE

- Assistant Professor, University of Connecticut, *Aug. 2014–Jul. 2020*
- Engineering Supervisor, Product Optimization, Caterpillar Inc., *Jan. 2014–Jul. 2014*
- Engineering Supervisor, Structural Optimization, Caterpillar Inc., *Jan. 2012–Dec. 2013*
- Engineering Specialist Research/Development, Caterpillar Inc., *Apr. 2010–Dec. 2011*
- Sr. Research Engineer, Caterpillar Inc., *Apr. 2006–Mar. 2010*
- Sr. Project Engineer, Belcan Corporation, *Dec. 2004–Mar. 2006*
- Graduate Research Assistant, Center for Process Simulation and Design, University of Illinois at Urbana-Champaign, *Aug. 2001–Dec. 2004*

PROFESSIONAL AFFILIATIONS AND SERVICE

EDITORIAL SERVICE

- **Senior Advisor, Journal of Structural and Multidisciplinary Optimization**, Feb. 2024–Present
- **Associate Editor, ASME Journal of Mechanical Design**, Aug. 2020–Present
- Review Editor, Journal of Structural and Multidisciplinary Optimization, Dec. 2013–Jan. 2024
- Invited Guest Editor for Special Issue on 14th World Congress of Structural and Multidisciplinary Optimization, 2022
- Invited Guest Editor for Special Issue on Design Methods for Advanced Manufacturing in ASME Journal of Mechanical Design, Jan. 2023
- Invited Guest Editor for Special Issue Dedicated to Founding Editor George Rozvany of the Journal of Structural and Multidisciplinary Optimization, Dec. 2015
- Reviewer for the following publications: Computer Methods in Applied Mechanics and Engineering, International Journal of Numerical Methods in Engineering, Structural and Multidisciplinary Optimization, ASME Journal of Mechanical Design, Computer-Aided Design, Finite Elements in Analysis and Design, Mechanism and Machine Theory, Journal of Optimization Theory and Applications, Journal of Manufacturing Science and Engineering and PLOS ONE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

- Member of Executive Committee of Design Automation Committee, Aug. 2019–Aug. 2023
- Past Executive Committee Chair, ASME Design Automation Committee, 2024
- Executive Committee Chair, ASME Design Automation Committee, 2023
- **Conference Chair, ASME Design Automation Conference**, 2022
- Program Chair, ASME Design Automation Conference, 2021
- Member of the ASME Design Automation Committee, 2012–Present
- **Invited Co-organizer of Journal of Mechanical Design Webinar**, Sept. 16, 2021
- Industry Liaison of the ASME Design Automation Committee, Mar. 2012–Aug. 2014
- Organizer of panel on “Industrial Design Automation in the Cloud: Opportunities and Challenges” at the *38th Design Automation Conference*, Chicago, Illinois, Aug. 2012
- Co-organizer, Paper Review Coordinator and/or Co-Chair of Technical Sessions on “Design of Engineering Materials and Structures” and “Novel Applications of Structural Optimization” at every *ASME Design Automation Conference* from 2012 to 2020. Creator and co-organizer of Technical Session on “Computational Design for Biomedical Applications”, 2019–2024.

INTERNATIONAL SOCIETY OF STRUCTURAL AND MULTIDISCIPLINARY OPTIMIZATION

- **Elected Member of ISSMO Executive Committee, Treasurer**, Jun. 2023–Present
- **Member of Local Organizing Committee for 14th World Congress of Structural and Multidisciplinary Optimization**, Jul. 2021
- Invited Host of TOP Webinar (organized by Delft University and Technical University of Denmark), Nov. 2020
- Member of International Papers Committee for WCSMO (Beijing), 2019.
- Member of Scientific Advisory Committee and Co-chair of Technical Session at the World Congresses in Structural and Multidisciplinary Optimization, 2013 (Orlando), 2015 (Sydney), 2017 (Braunschweig) and 2019 (Beijing).

UNITED STATES ASSOCIATION OF COMPUTATIONAL MECHANICS

- Co-organizer of technical sessions in the US National Congress of Computational Mechanics, 2009 (Columbus), 2014 (Montreal), 2019 (Austin), 2021 (Chicago/virtual), and 2025 (Chicago).
- Co-organizer of a technical session in the World Congress of Computational Mechanics, 2018 (New York City), 2021 (Paris/virtual), 2022 (Yokohama/virtual).

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

- Member of the Multidisciplinary Optimization Technical Committee, *Apr. 2008–Jan. 2011*
- Session Chair and Paper Reviewer of Technical Sessions on “MA&O - Product Design” and “Topology Optimization” at the *13th AIAA/ISSMO Multidisciplinary Analysis Optimization (MAO) Conference*, Fort Worth, Texas, Sep. 2010.

PUBLICATIONS

JOURNAL ARTICLES—PUBLISHED¹

1. Nguyen-Van, S., Manogharan, G., Huang, L. H., and Norato, J. A. (2025). “Surrogate models of stress for triply periodic minimal surface lattices.” *Computer Methods in Applied Mechanics and Engineering*, 444, 118119. DOI: <https://doi.org/10.1016/j.cma.2025.118119>.
2. Cohen, D., and Norato, J.A. (2025). “Optimal design of triply-periodic minimal surface implants for bone repair.” *Structural and Multidisciplinary Optimization*, 68(6), 1-14. DOI: <https://doi.org/10.1007/s00158-025-04032-9>
3. Cohen, D., Aboutaleb, S.M.G., Wagoner Johnson A.J., and Norato, J.A. (2025) “Computational design of additively manufactured curvilinear scaffolds for bone repair with analytical sensitivities.” *Journal of Mechanical Design*, 147 (3), 031702. DOI: <https://doi.org/10.1115/1.4066547>.
4. Gandhi, Y., Aragón, A., Norato, J., and Minak, G. (2025) “A geometry projection method for the topology optimization of additively manufactured variable-stiffness composite laminates.” *Computer Methods in Applied Mechanics and Engineering*, 435, 117663, DOI: <https://doi.org/10.1016/j.cma.2024.117663>.
5. Hu, J., Wallin, M., Ristinmaa, M., Norato, J.A., and Liu, S. (2025) “Geometrically non-linear topology optimization via geometry projection.” *Computer Methods in Applied Mechanics and Engineering*, 435, 117636, DOI: <https://doi.org/10.1016/j.cma.2024.117636>.
6. Cuevas-Carvajal, N., Montoya-Vallejo, M.F., and Norato, J.A. (2025). “A geometry projection method for topology optimization of frames with structural shapes”. *Structural and Multidisciplinary Optimization*, 68(5), DOI: <https://doi.org/10.1007/s00158-024-03936-2>.
7. Gu, H., b, and Norato, J. A. (2023). “Manufacturing-Cost-Driven Topology Optimization of Welded Frame Structures”. *Journal of Mechanical Design*, 145(8), 081702. DOI: <https://doi.org/10.1115/1.4062394>.

¹Graduate students in bold.

8. Smith, H. and Norato, J. (2023). "Simultaneous material and topology optimization of composite laminates." *Computer Methods in Applied Mechanics and Engineering*, 404, p.115781. DOI: <https://doi.org/10.1016/j.cma.2022.115781>.
9. Norato, J.A., Smith, H.A., Deaton, J.D. and Kolonay, R.M. (2022). "A maximum-rectifier-function approach to stress-constrained topology optimization". *Structural and Multidisciplinary Optimization*, 65(10), p.286. DOI: <https://doi.org/10.1007/s00158-022-03357-z>.
10. Smith, H., and Norato, J.A. (2022) "Topology Optimization of Structures Made of Fiber-Reinforced Plates." *Structural and Multidisciplinary Optimization*, 65, 58. DOI: <https://doi.org/10.1007/s00158-021-03164-y>.
11. Cuevas-Carvajal, N., Cortes-Ramirez, J.S., Norato, J.A., Hernandez, C., and Montoya-Vallejo, M.F. (2022) "Effect of geometrical parameters on performance of conventional Savonius VAWT: A review." *Renewable and Sustainable Energy Reviews*, 161, 112314. DOI: <https://doi.org/10.1016/j.rser.2022.112314>.
12. Kazemi, H., and Norato, J.A. (2022) "Topology optimization of programmable lattices with geometric primitives." *Structural and Multidisciplinary Optimization*, 65, 33. DOI: <https://doi.org/10.1007/s00158-021-03094-9>.
13. Cohen, D., Aboutaleb, S.M.G., Wagoner Johnson A.J., and Norato, J.A. (2021) "Bone adaptation-driven design of periodic scaffolds." *Journal of Mechanical Design*, 143 (12), 121701. DOI: <https://doi.org/10.1115/1.4050928>.
14. Kazemi, H., and Norato, J.A. (2021) "Topology optimization of lattices with anisotropic struts." *Structural and Multidisciplinary Optimization*, 63:1653–1668. DOI: <https://doi.org/10.1007/s00158-020-02822-x>.
15. Smith, H., and Norato, J.A. (2021) "Topology optimization with discrete geometric components made of composite materials." *Computer Methods in Applied Mechanics and Engineering*, 376, 113582, DOI: <https://doi.org/10.1016/j.cma.2020.113582>.
16. Wein, F., Dunning, P.D., and Norato, J.A. (2020) "A review on feature-mapping methods for structural optimization." *Structural and Multidisciplinary Optimization*, 62:1597–1638. DOI: <https://doi.org/10.1007/s00158-020-02649-6>.
17. Sanders, C., Norato, J., Walsh, T., and Aquino, W. (2020) "An error-in-constitutive equations strategy for topology optimization for frequency-domain dynamics." *Computer Methods in Applied Mechanics and Engineering*, 372, 113330, DOI: <https://doi.org/10.1016/j.cma.2020.113330>.
18. Smith, H., and Norato, J.A. (2020) "A MATLAB code for topology optimization using the geometry projection method." *Structural and Multidisciplinary Optimization*, 62:1579–1594. DOI: <https://doi.org/10.1007/s00158-020-02552-0>.
19. Zhang, S., Gain, A.L., and Norato, J.A. (2020) "Adaptive mesh refinement for topology optimization with discrete geometric components." *Computer Methods in Applied Mechanics and Engineering*, 364, 112930, DOI: <https://doi.org/10.1016/j.cma.2020.112930>.
20. Kazemi, H., Vaziri, A., and Norato, J.A. (2020) "Multi-material topology optimization of lattice structures using geometry projection." *Computer Methods in Applied Mechanics and Engineering*, 363, 112895. DOI: <https://doi.org/10.1016/j.cma.2020.112895>.
21. Armstrong, A.A., Norato, J., Alleyne, A.G., and Wagoner Johnson, A.J. (2019) "Direct process feedback in extrusion-based 3D bioprinting." *Biofabrication*, 12(1): 015017. DOI: <https://doi.org/10.1088/1758-5090/ab4d97>.
22. Zhang, S., Le, C., Gain, A.L., and Norato, J.A. (2018) "Fatigue-based topology optimization with non-proportional loads." *Computer Methods in Applied Mechanics and Engineering*, 345, 805–825. DOI: <https://doi.org/10.1016/j.cma.2018.11.015>.
23. Xiong, J., Du, Y., Mousanezhad, D., Asl, M.E., Norato, J., and Vaziri, A. (2018) "Sandwich structures with prismatic and foam cores: a review." *Advanced Engineering Materials*, 21(1), 1800036. DOI: <https://doi.org/10.1002/adem.201800036>.
24. Kazemi, H., Vaziri, A., and Norato, J.A. (2018) "Topology optimization of structures made of discrete geometric components with different materials." *ASME Journal of Mechanical Design, Special Issue*

- on *Design of Engineered Materials and Structures*, 140, p. 111401-11. DOI: <https://doi.org/10.1115/1.4040624>.
25. Norato, J.A. (2018) "Topology optimization with supershapes." *Structural and Multidisciplinary Optimization*, 58(2), p. 415-434, 2018. DOI: <https://doi.org/10.1007/s00158-018-2034-z>.
 26. Ebrahimi, H., Someh, L. K., Norato, J., and Vaziri, A. (2018). "Blast-resilience of honeycomb sandwich panels." *International Journal of Mechanical Sciences* 144, p. 1–9. DOI: <https://doi.org/10.1016/j.ijmecsci.2018.05.038>.
 27. Ebrahimi, H., Mousanezhad, D., Nayeb-Hashemi, H., Norato, J., and Vaziri, A. (2017) "3D cellular metamaterials with planar anti-chiral topology." *Materials and Design* 145, 226-231. DOI: <https://doi.org/10.1016/j.matdes.2018.02.052>.
 28. Zhang, S., Gain, A.L., and Norato, J.A. (2017) "A geometry projection method for the topology optimization of curved plate structures with placement bounds." *International Journal of Numerical Methods for Engineering*, 2017;1–19. <https://doi.org/10.1002/nme.5737>. DOI: <https://doi.org/10.1002/nme.5737>.
 29. Picelli, R., Townsend, S., Brampton, C., Norato, J., and Kim, H. A. (2018) Stress-based shape and topology optimization with the level set method. *Computer Methods in Applied Mechanics and Engineering*, 329, 1–23. DOI: <https://doi.org/10.1016/j.cma.2017.09.001>.
 30. Roberge, J., and Norato, J. Computational design of curvilinear bone scaffolds fabricated via direct ink writing. (2018) *Computer-Aided Design*, 95, 1–13. DOI: <https://doi.org/10.1016/j.cad.2017.09.003>.
 31. Zhang, S., Gain, A. L., and Norato, J.A. (2017) "Stress-based topology optimization with discrete geometric components." *Computer Methods in Applied Mechanics and Engineering*, 325, p. 1–21, DOI: 10.1016/j.cma.2017.06.025.
 32. Zhang, S., and Norato, J. A. (2017) "Optimal design of panel reinforcements with ribs made of plates." *ASME Journal of Mechanical Design*, 139, p. 081403-1–081403-11. DOI: 10.1115/1.4036999, 2017.
 33. Zhang, S., Norato, J. A., Gain, A. L., and Lyu, N. (2016) "A geometry projection method for the topology optimization of plate structures." *Structural and Multidisciplinary Optimization*, invited contribution for Special issue dedicated to Founding Editor George Rozvany., 54(5), p. 1173–1190, DOI: 10.1007/s00158-016-1466-6. DOI: <https://doi.org/10.1007/s00158-016-1466-6>.
 34. Norato, J., Bell B., and Tortorelli, D. (2015) "A geometry projection method for continuum-based topology optimization with discrete elements", *Computer Methods in Applied Mechanics and Engineering*, 293, p. 306–327. DOI: <https://doi.org/10.1016/j.cma.2015.05.005>.
 35. Shin, M., Tortorelli, D.A., and Norato, J.A. (2015) "Optimal shape design of axisymmetric structures subject to asymmetric loading", *Computer Methods in Applied Mechanics and Engineering*, 293, p. 283–305. DOI: <https://doi.org/10.1016/j.cma.2015.05.008>.
 36. Norato, J., and Wagoner Johnson, A. (2011) "A computational and cellular solids approach to the stiffness-based design of bone scaffolds", *ASME Journal of Biomechanical Engineering*, 133(9). DOI: <https://doi.org/10.1115/1.4004994>.
 37. Le, C., Norato, J., Bruns, T., Ha, C., and Tortorelli, D. (2010) "Stress-based topology optimization for continua". *Structural and Multidisciplinary Optimization*, 41(4), p. 605–620. DOI: <https://doi.org/10.1007/s00158-009-0440-y>.
 38. Silva, M., Tortorelli, D.A., Norato, J.A., Ha, C., and Bae, H-R. (2010) "Component and system reliability-based topology optimization using a single-loop method". *Structural and Multidisciplinary Optimization*, 41(1), p. 87–106. DOI: <https://doi.org/10.1007/s00158-009-0401-5>.
 39. Norato, J.A., Bendsoe, M.P., Haber, R.B., and Tortorelli, D.A. (2007) "A topological derivative method for topology optimization". *Structural and Multidisciplinary Optimization*, 33(4-5), p. 375–386. DOI: <https://doi.org/10.1007/s00158-007-0094-6>.
 40. Norato, J.A., Haber, R.B., Tortorelli, D.A., and Bendsoe, M.P. (2004) "A geometry projection method for shape optimization". *International Journal for Numerical Methods in Engineering*, 60(14), p. 2289–2312. DOI: <https://doi.org/10.1002/nme.1044>.

CONFERENCE PROCEEDINGS

1. Smith, H.A., Norato, J.A. and Deaton, J.D. (2023) "Feature-Mapping Topology Optimization of a Wing-box with Geometric Constraints." In *AIAA SCITECH 2023 Forum* (p. 1271). DOI: <https://doi.org/10.2514/6.2023-1271>.
2. Cohen, D.O., Aboutaleb, S.M., Wagoner Johnson, A. and Norato, J.A. (2022). "Computational Design of Additively Manufactured Curvilinear Scaffolds for Bone Repair." In *International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* (Vol. 86229, p. V03AT03A007). American Society of Mechanical Engineers. DOI: <https://doi.org/10.1115/DETC2022-90582>.
3. Smith, H., Norato, J.A., Deaton, J.D., and Kolonay, R.M. (2021) "Topology Optimization for Buckling via Geometry Projection". In *AIAA Scitech 2022 Forum*, AIAA 2022-2245. DOI: <https://doi.org/10.2514/6.2022-2245>.
4. Smith, H., Norato, J.A. (2021) "Topology Optimization of Fail-Safe Structures via Geometry Projection". In *AIAA Scitech 2021 Forum*, AIAA 2021-2026. DOI: <https://doi.org/10.2514/6.2021-2026>.
5. Smith, H., Norato, J. A. (2020). "A Topology Optimization Method for the Design of Orthotropic Plate Structures". In *ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* , DETC2020-22400, V11AT11A054. DOI: <https://doi.org/10.1115/DETC2020-22400>.
6. Kazemi, H., Vaziri, A., Norato, J. A. (2019). "Topology optimization of multi-material lattices for maximal bulk modulus". In *ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference* , DETC2019-97370, V02AT03A052. DOI: <https://doi.org/10.1115/DETC2019-97370>.
7. Smith, H., Norato, J.A. (2019) "Geometric constraints for the topology optimization of structures made of primitives". In *SAMPE Conference Proceedings*, DOI: <https://doi.org/10.33599/nasampe/s.19.1518>.
8. Smith, H., Norato, J.A. (2019) "A geometry projection method for the design exploration of wing-box structures". In *AIAA Scitech 2019 Forum*, AIAA 2019-2353. DOI: <https://doi.org/10.2514/6.2019-2353>.
9. Zhang, S., Norato, J. A. (2018). "Finding better local optima in topology optimization via tunneling". In *ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, DETC2018-86116, V02BT03A014. DOI: <https://doi.org/10.1115/DETC2018-86116>.
10. Picelli, R., Townsend, S., Brampton, C., Norato, J., Kim, H.A. (2017) "Stress minimization using the level set topology optimization,." In *Proceedings of the 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, DOI: <https://doi.org/10.2514/6.2017-1544>.
11. Zhang, S., and Norato, J. A. (2016) "A geometry projection method for the optimal design of panel reinforcements with ribs made of plates." In *Proceedings of the ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, DETC2016-59985, V02BT03A011. DOI: <https://doi.org/10.1115/DETC2016-59985>.
12. Norato, J.A. (2015) "A geometry projection method for the optimal distribution of short fiber reinforcements." In *Proceedings of the ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, V02BT03A010. DOI: <https://doi.org/10.1115/DETC2015-47406>.
13. Bell, B., Norato, J., and Tortorelli, D. (2012) "A geometry projection method for continuum-based topology optimization of structures", *Proceedings of the 14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*. DOI: <https://doi.org/10.2514/6.2012-5485>.
14. Lu, S., Kim, H.M., Norato, J., and Ha, C. (2008) "Analytical Target Cascading for Multi-Mode Design Optimization: An Engine Case Study", *Proceedings of the 4th AIAA Multidisciplinary Design Optimization Specialist Conference*. DOI: <https://doi.org/10.2514/6.2008-2219>.

15. Norato, J.A., Haber, R.B., Tortorelli, D.A., and Bendsøe, M.P. (2005) “A Geometry Projection and Optimality Criterion Method for Topology Optimization using the Topological Derivative”, *Proceedings of the 6th World Congress on Structural and Multidisciplinary Optimization, Rio de Janeiro*.

PATENTS

1. Vijay Yalamanchili, Justin Mach, Julian Norato, and Badrinarayan Athreya, “Method and system for determining welding process parameters”. Sept. 2017. U.S. Patent 10,325,036.
2. Julian Norato, Sungmoon Jung, Badrinarayan Athreya, and Christopher Ha, “Method and system for determining welding sequences”. Issued Aug. 2015. U.S. Patent 9,102,012.