

SACHIN SEAN GUPTA

Experienced computational design researcher and programmer specializing in creating software pipelines at the intersection of architecture, simulation, and the natural sciences.

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EDUCATION

Master of Science
University of Stuttgart
Stuttgart, Germany
OCT 2015 – OCT 2017

- Integrative Technologies & Architectural Design Research (Institute for Computational Design)
- Example coursework: computational design, architectural biomimetics, research methods

Bachelor of Science
Rice University
Houston, TX
AUG 2011 – MAY 2015

- Materials Science & Nano-Engineering; Minor in Ecology & Evolutionary Biology
- Example coursework: engineering computation, material science, sustainable design

EXPERIENCE

Software Engineer
LeapThought
Honolulu, HI / São Paulo, Brazil
FEB 2021 – JAN 2025

- Core SDK developer responsible for building and maintaining a C# codebase of computational geometry algorithms and data structures representing AEC elements from IFC files.
- Headed US developer team and grew Brazil developer team for automated building code compliance checking cloud product deployed for industry partners in Singapore.

Computational Designer
Freelance
New York, NY
MAR 2020 – JAN 2021

- Created custom Python/C# packages for client to import algorithms from computational geometry libraries into Grasshopper to enable complex geometric mapping functions.
- Integrated computer vision algorithms within Grasshopper for client to able to extract specific geometric data from raw aerial imagery.

Adjunct
New Jersey Institute of Technology
Newark, NJ
JAN 2020 – MAY 2020

- Faculty member of the Hillier College of Architecture & Design teaching fundamentals of design in ARCH 102: Introduction to Design II.
- Entrusted with section of twenty-eight freshman students from diverse backgrounds; successfully transitioned to remote class during the COVID-19 pandemic.

Research Assistant
Digital Manufacturing & Design Centre
Singapore, Singapore
FEB 2018 – OCT 2019

- Research team computational design lead responsible for developing Grasshopper/C# design-to-fabrication pipelines to model, simulate, and prototype novel dynamic structures.
- Published extensively, secured multiple research grants, and strategized institutional research trajectory roadmaps for future projects in large-scale additive manufacturing.

EXPERTISE

Programming + Scripting	Languages	Libraries	Frameworks / Developer Tools
	C# Python Javascript, Typescript (<1 year) C++ (<1 year)	<i>computational geometry</i> : CGAL, libigl, Shapely, NetTopologySuite <i>computer graphics</i> : ThreeJS <i>computer vision</i> : OpenCV <i>optimization</i> : RBFOpt	.NET NodeJS AzureDevOps Git VisualStudio, VS Code
3D Modeling + Simulation	Rhinoceros, Grasshopper, SOFiSTiK, Solidworks, AutoCAD		
Graphic + Web Design	Adobe InDesign, Illustrator, Photoshop, image + video editing, presentation design		
Desktop + Verbal	Microsoft Office, scientific journal and research grant writing (~4 years), Brazilian Portuguese (intermediate)		

AWARDS & PUBLICATIONS

Journal Articles

S. Gupta*, D. Jayashankar*, and K. Tracy, "Hygro-Responsive Canopies: Scaled Passive Actuation with Chitosan Composites," In press: *Technology | Architecture & Design*.

*Authors contributed equally to this work

S. Gupta, Y. Tan, P. Chia, C. Pambudi, Y. Quek, C. Yogiama, and K. Tracy, "Prototyping knit tensegrity shells: a design-to-fabrication workflow", *SN Applied Sciences*, 2(6), 2020. doi: <https://doi.org/10.1007/s42452-020-2693-4>.

P. Giachini*, **S. Gupta***, W. Wang, D. Wood, M. Yunusa, E. Baharlou, M. Sitti, A. Menges, "Additive Manufacturing of Cellulose-Based Materials with Continuous, Multidirectional Stiffness Gradients", *Science Advances*, 6(8), 2020. doi: 10.1126/sciadv.aay0929.

*Authors contributed equally to this work

D. Jayashankar, **S. Gupta**, N. Sanandiya, J. Fernandez, and K. Tracy, "Fibre Reinforced Composite Manufacturing for Passive Actuators", *International Journal of Advanced Manufacturing Technology*, 2020. doi: <https://doi.org/10.1007/s00170-020-05744-6>.

Conference Proceedings

S. Loo, D. Jayashankar, **S. Gupta**, and K. Tracy, "Hygro-Compliant: Responsive Architecture with Passively Actuated Compliant Mechanisms", Proceedings of RE: Anthropocene: Design in the Age of Humans: 25th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA), Apr. 2020, Bangkok, Thailand, Accepted for Publication.

S. Loo, **S. Gupta**, C. Yogiama, and K. Tracy, "Soft Mechatronic, Aerodynamic Architecture Studio", Proceedings of 108th Association of Collegiate Schools of Architecture Annual Meeting (ACSA), Mar. 2020, San Diego, CA, Accepted for Publication.

S. Gupta, D. Jayashankar, S. Loo, and K. Tracy, "Biomaterial-Activated Responsive Truss Systems", Proceedings of Responsive Cities – Disrupting Through Circular Design, Nov. 2019, Barcelona, Spain, Accepted for Publication.

K. Tracy, **S. Gupta**, S. Loo, J. So, A. Pal, T. Wortmann, and R. Bamford, "Tensile Configurations - Exploring Spatial Membrane Tensegrity Shell Structures", Proceedings of ACADIA 2019 - The Association for Computer Aided Design in Architecture, Oct. 2019, Austin, TX.

S. Gupta, Y. Tan, P. Chia, C. Pambudi, C. Yogiama, and K. Tracy, "Knit Tensegrity Shell", Proceedings of 60th Anniversary Symposium of the International Association for Shell and Spatial Structures (IASS 2019), Oct. 2019, Barcelona, Spain.

S. Gupta, D. Jayashankar, and K. Tracy, "Dynamic Space Truss-Textile Membrane Assemblies", Proceedings of 60th Anniversary Symposium of the International Association for Shell and Spatial Structures (IASS 2019), Oct. 2019, Barcelona, Spain.

D. Jayashankar, **S. Gupta**, S. Loo, and K. Tracy, "3D Printing of Compliant Passively Actuated 4D Structures", Proceedings of 30th Annual International Solid Freeform Fabrication Symposium (SFF 2019), Aug. 2019, Austin, TX.

S. Gupta, D. Jayashankar, N. Sanandiya, J. Fernandez, and K. Tracy, "Prototyping of Chitosan-Based Shape-Changing Structures", Proceedings of Intelligent & Informed: 24th International Conference of Computer Aided Architectural Design Research in Asia (CAADRIA), Apr. 2019, Wellington, New Zealand.

Patents

"A Structure and a Method of Forming a Structure." Singapore Patent No. PCT/SG2020/050115. Filed March 6 2020.

Awards

Winner, International Association for Shell and Spatial Structures (IASS) 2019 Form and Force Pavilion Competition, *Knit Tensegrity Shell*.
BIM Award 2018, BIM Cluster Baden-Württemberg: Research, *ICD/ITKE Research Pavilion 2016-17*.