NATHAN MELENBRINK

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ACADEMIC POSITIONS

Wyss Institute for Biologically Inspired Engineering, Harvard University: Cambridge, MA: Fall 2016 – present

Fellow in Computer Science; a 3-year full-time position researching swarm robotics for architectural and infrastructural construction as a part of the Bio-Inspired Robotics Platform. Work scope ranges from development of custom simulation software to physical prototyping of robotic actuators and construction kits.

Northeastern University College of Art, Media and Design: Fall 2017 - Spring 2018

Adjunct Professor; Developed an original curriculum for ARTG 2260: Programming Basics, teaching creative coding in a design-studio format with an emphasis on developing novel applications. Interactive online course material hosted at https://nathanmelenbrink.github.io/artg2260/.

MIT School of Architecture + Planning: Spring 2017

Instructor; Worked collaboratively to develop and teach a new course called *How to Design (Almost) Anything,* modeled as a sequel to *How to Make* and providing an introductory design-studio based course for non-designers. Contributions included original curriculum development, lecture content, studio critiques and evaluations as well as the design and development of core course materials hosted at http://fab.cba.mit.edu/classes/HTDAA.17/.

University of Hong Kong Shanghai Study Centre: Fall 2012 – Spring 2014

Assistant Professor; Independently developed unique curricula and course materials for the undergraduate requisite lecture courses Visual Communications II (Material Culture) and III (Animate Systems), providing project-based instruction for Rhino, Grasshopper, Illustrator, Photoshop, Vasari and Ecotect for environmental analysis.

University of Hong Kong: Fall 2010- Spring 2011

Research Assistant; responsibilities included conducting design research for a project entitled “Endurance and Obsolescence”, analyzing current trends in Chinese urbanism and developing digital tools that aim to project more successful urban growth patterns for specific cities in China.

Virginia Tech Summer Qualifying Lab: Blacksburg, VA: 2010

Adjunct Faculty; worked as a general design tutor for first year studio, offering specific instruction for Rhino 4.0 and Grasshopper as well as laser cutting and CNC use. Additionally developed and co-taught a 3-credit course called “Design in the Digital Age”, directed at preparing students with software skills necessary for professional internships.

INDUSTRY EXPERIENCE

East China Architectural Design Institute: Shanghai, PR China: October 2013 – August 2014

Senior Architect; Completed the redesign of a super-highrise in Dalian, PRC. Although already under construction, the facade, interior, podium and tower crown were completely reworked from a conceptual phase. Additional tasks included design critiques of other current projects as well as instructional lectures and tutorials. Almost all communication was in Mandarin Chinese.

Playze China Co. Ltd: Shanghai, PR China: September 2012 - October 2013

Architect; Contributed a leading role to the office’s largest project, the Ningbo Urban Planning Museum, specifically the design for the custom ceramic facade, as well as general massing and landscape design.

Additionally led small teams for two urban design projects, a hotel, an office interior design and a worker lodging project using shipping containers.

UNStudio: Shanghai, PR China: July 2011 - July 2012

Junior Architect; Primary focus was as the parametric design and facade specialist for the Shanghai office. Served as the lead facade designer for a large office complex from schematic design through design development phase; additionally worked on 2 competition teams, co-led an 8-person competition team and coordinated knowledge exchange and training with the Amsterdam office.

WORKSHOPS / TEACHING

MIT Media Lab / Center for Bits and Atoms: Fall 2015 - present

Teaching Assistant; Served as a Teaching Assistant for the Harvard section of Professor Neil Gershenfeld's course *How to Make (Almost) Anything.* Topics include digital fabrication, AVR microcode, and electronics prototyping.

NuVu Studio: Cambridge: Spring 2015 - present

Coach; Taught over a dozen two-week studio sections on design and robotics to students aged 11-18. Topics included *Sci-Fi Vehicles, Sci-Fi Toys, Future Shoes*, *Food Space*, *Robot Swarms, Robo-Pets* and *Battlebotics*. Taught international studios related to swarm robotics in Glasgow and Mumbai.

University of Nottingham Department of Architecture and Built Environment: Spring 2014

Visiting Instructor; Organized and taught a series of full-weekend workshops at the Ningbo, China campus. Students were provided with instruction from basic Rhino to advanced computational methods, with the ultimate outcome being a group-designed and constructed pavilion.

Architectural Association: Shanghai, PR China; July 2012, 2013, 2014, 2015, 2016

Unit Tutor; Repeatedly served as an instructor in the AA Shanghai Summer Studio. Responsibilities included development of a project brief, training in a “tooling up” phase, followed by a group project. Work was presented to a large audience and published in various formats.

TECHNICAL SKILLS

Proficient in advanced 3D modeling and rendering, specifically Rhino (including T-Splines and VRay), 3DS Max, Unity3D and Maxwell Render. Extensive experience with C#, C, Processing, Arduino, Rhinoscript, Grasshopper, Python and VB Script. Experienced with Mastercam and CNC fabrication as well as laser cutting and 3D printing. Proficient with Adobe Creative Suite, specifically Photoshop, Illustrator and InDesign. Competent in AutoCAD, Revit, Generative Components, Vasari and Ecotect. Extensive teaching experience with Processing, Arduino, Rhino 5, Grasshopper, Rhinoscript, Unity3D, Illustrator, Photoshop, Sketchup, Ecotect, Vasari, and digital fabrication methods. Native fluency in English and professionally conversational (spoken and written) in Mandarin Chinese. I also maintain a youtube channel [youtube.com/nathanmelenbrink] for computational design and software tutorial videos.

EDUCATION

Institute for Computational Design and Construction
Faculty of Architecture and Urban Planning, University of Stuttgart
Doctoral Candidate (expected 2020), advisor Prof. Achim Menges

Harvard University Graduate School of Design, Cambridge, Massachusetts
Master in Design Studies in Technology 2016

Virginia Polytechnic Institute & State University, Blacksburg, Virginia
Bachelor of Architecture, In Honors, Summa Cum Laude, GPA 3.83 [out of 4.0]
Awarded 2010 Alpha Rho Chi Medallion for Outstanding Student Leadership

School of Architecture, College of Architecture and Urban Planning
Tongji University, Shanghai, PR China 2008-2009

US Green Building Council LEED Accredited Professional

Coursework in Digital Fabrication, Electronics Design, Robotics, Physical Computing, Virtual Reality, Game Design, Immersive Media, Advanced Architectural Design, Algorithmic Design, Computer Music + Theory, Urban Planning, Political Science, Structural Design, Environmental Building Systems

PUBLICATIONS

2019 N. Melenbrink and J. Werfel, "Autonomous Sheet Pile Driving Robots for Soil Stabilization." *2019 IEEE/RSJ International Conference on Robotics and Automation*. (In Review)

2018 J. Howell and N. Melenbrink, "Visualizing Urban vs. Rural Sentiments in Real-time." *2018 /Proceedings of the International Conference on Complex Systems*, Springer pp. 414-423

2018 N. Melenbrink and J. Werfel, "Local force cues for strength and stability in a distributed robotic construction system." *Swarm Intelligence*, 12(2), pp.129-153.

2017 N. Melenbrink, P. Kassabian, P. Michalatos, and J. Werfel, "Using Force Measurements to Guide Construction by Distributed Climbing Robots." *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems*.

2017 N. Melenbrink, P. Kassabian, A. Menges, and J. Werfel, "Towards Force-aware Robot Collectives for On-Site Construction." *2017 Proceedings of the Association for Computer Aided Design in Architecture*.

2016 N. King, N. Melenbrink, N. Cote, and G. Fagerstrom. "BUILD-ing the Lo-Fab Pavilion: Dynamo-driven collaborative robotic fabrication workflows for the construction of spatial structures" in Proceedings of the 3rd International Conference on Robots in Architecture, Art, and Design (RobArch), May 2016

2015 N. Melenbrink and N. King; *Fulldome Interfacing*, Emerging Experience in Past, Present and Future of Digital Architecture, Proceedings of the 20th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA 2015) / Daegu 20-22 May 2015, pp. 221-230 http://cumincad.scix.net/cgi-bin/works/Show?caadria2015_015

2013 N. Melenbrink; "Digital Architecture: Applied Parametrics and Computational Logic", *area China Magazine;* 100 + 22 *New Geometries*, May 2013 issue.

LECTURES, PRESENTATIONS and JURIES

2019 Scientific Committee for the ACM/SIGSIM Symposium on Simulation for Architecture and Urban Design (SimAUD2019)

2018 "Towards a Machine Ecology" Lecture at the Institute for Computational Design and Construction, University of Stuttgart, November 19th, 2018

2018 “Truss Assembly with Force-Aware Robot Collectives” Poster Presentation at the 2018 International Conference on Complex Systems. July 25th, 2018

2018 “Swarm Robotics for Construction Automation” Lecture at the Robotics In Construction Summit, Autodesk BUILD Space, Boston, MA. June 21st, 2018

2018 “Truss Assembly with Force-Aware Robot Collectives” Poster Presentation at the 2018 ACM Symposium on Computational Fabrication. June 19th, 2018

2017 “The Automated Tower” Orientation workshop at the Harvard University Graduate School of Design

2017 Introductory Coding and Robotics Workshop and Research Presentation, Institute for Computational Design, University of Stuttgart, June 26th -30th

2017 “Low-cost Force-sensing Methods for Evaluating Strength and Stability in Large-scale Unsupervised Construction” Poster Presentation at the Robotics: Science and Systems conference workshop on Material Robotics

2016 Swarm Robotics Workshop and Research Presentation, Institute for Computational Design, University of Stuttgart, July 1st - 3rd

2016 Robot Swarms! Introductory coding and robotics workshop at the American School of Bombay, Mumbai, India

2015 "Project Delivery in China" Lecture at the Harvard University Innovation Lab as guest lecturer for Professor Mark R. Johnson’s course PRO-07420 - Innovation in Project Delivery, Cambridge, MA; November 24th.

2015 *Boston Tech Poetics Demo Night:* Harvard GSD, Piper Auditorium. Served as event co-organizer and contributed original works for demonstration.

2015 "Design Technology" Lecture at the Virginia Tech College of Architecture and Urban Studies, sponsored by the Digital Mentorship Collaborative (DMCO) bi-annual lecture series. Blacksburg, VA; April 17th. http://archdesign.vt.edu/events/lectures/2015.1%20Spring/1530

2015 "Computation + Design" Lecture at the Rhode Island School of Design, Department of Architecture, Providence, RI; January 10th

2014 *Fulldome Projections: Interfacing Ephemeral Urbanism*, Served as organizer and Cluster Champion for a research cluster at the SmartGeometry conference in Hong Kong

2013 “Applied Computation and the Digital Toolbox” Lecture at the Shanghai *Food for Thought* series, sponsored by the AIA and the Architect@Work Conference, December 4th.

2013 “Parametric Thinking in Practice and Education” Lecture at University of Nottingham, Ningbo, China, Department of Architecture and Built Environment, on November 9th.

2013 Juror for the Next7 International Design Competition (sponsored by ArcH2O). http://www.arch2o.com/next7/ [retreived 28 December 2015]

2013 “New Digital Architecture” Lecture at *Area Dialogue 15*, Shanghai PRC, April 4th.

2010 “Computation vs. Computerization” Lecture at Virginia Tech, July 18th

2009 Str8 Scrippin' – Virginia Tech's First Computational Design Exhibition (primary organizer, curator and contributor)