Nathan W. Brei

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EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
Bachelor's of Science in Aerospace Engineering, June 2011
Awards: Lufthansa Prize for Excellence in German Studies, 3rd Place.
Coursework:

Applied math: ODEs, Linear Algebra, Computational Science and Engineering
Engineering: Numerical methods, Structural Mechanics, Aerodynamics
Architecture: Design studios 1 & 2; History and Theory of Architecture

International School of Düsseldorf, Düsseldorf, Germany
International Baccalaureate, June 2007. National Merit Finalist.

EXPERIENCE

Makani Power, *Design Engineer Intern* *November 2012 - February 2013*
Designed, implemented, and tested structural elements and chain drives. Rapid prototyping was coupled with hand analysis, CAD (with SolidWorks, NX) and FEA (with CosmosWorks). Worked with steel, plastic, and carbon-fiber composite. These efforts contributed to the rapid and successful completion of Makani's integrated ground station, a mobile system acting as an anchor, a winch, a perch, and a battery array for the Wing 7 airborne wind turbine.

Daedalus Innovation, *Backend Web Developer* *September - November 2012*
Coded core web application functionality in Python/Django and integrated with external packages including Zinnia CMS and OpenTok. Managed a Postgresql database and a Heroku deployment. These efforts contributed to BookAndTalk.com, a soon-to-be-launched startup bringing together book groups and famous writers.

Fairfield Foundation, *Archaeology Intern* *July - September 2012*
Archaeological fieldwork at four colonial sites in Tidewater Virginia. Surveyed, dug, cleaned, interpreted, and mapped test units and shovel tests. Sorted, cleaned, and catalogued artifacts. Did archival research on a historic estate. Helped renovate a 1920's gas station.

16.622: Senior capstone project *Fall 2010 - Spring 2011*
Designed and implemented a yearlong experiment, with a partner, under faculty guidance. Applied machine learning techniques to ultrawideband radio waveforms to improve localization performance. Tested ability to identify the material of barriers blocking the line of sight.

MIT Technology Laboratory for Advanced Materials and Structures
Undergraduate Research Opportunity Program *Summer 2010*
Designed, machined, and tested a device to hold individual carbon fibers under tension inside a CVD furnace. The results obtained with this device made up an entire chapter of a PhD thesis. Grew aligned carbon nanotube forests. Prepared carbon fibers with various coatings and tested their tensile strength. Prepared and cured graphite-epoxy composites.

MIT Daylighting Lab, *Undergraduate Research Opportunity Program* *Summer 2008*
Coded a daylighting simulation plugin, as part of a team, for SketchUp using Ruby and Java. Unified code and results from multiple master's theses. The plugin, 'LightSolve', calculates natural lighting characteristics and interactively assists with design optimization.

SKILLS

Programming: Fluent: Java, C, Matlab, Python. Familiar: Clojure, Scheme, Ruby, Arduino.
Linguistic: Fluent in German.
Design: SolidWorks, Rhino, NX, and & SketchUp CAD. Manual drafting, sketching, LaTeX.
Machine Shop: Waterjet, MIG welder, 3D printer, lathe, mill, etc.

INTERESTS

Applied math, operations research, computational design, optimization, computer vision, thin-tile vaulted structures. Drawing, Shotokan karate, caving, swing dancing.