

# 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*

Contributed to the rapid development and successful completion of Makani's new 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. Focused on the design/implementing/testing of structural elements and chain drives. Prototyping was coupled with extensive CAD (with SolidWorks, NX) and FEA (with CosmosWorks). Upon completion, built composite parts for Wing 7.

**Daedalus Innovation**, *Backend Web Developer*

*September - November 2012*

Contributed to BookAndTalk.com, a soon-to-be-launched startup bringing together book groups and famous writers. Coded core functionality in Python/Django and integrated with external packages including Zinnia CMS and OpenTok. Managed the Postgresql database and the Heroku deployment.

**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. 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**: Proficient: Java, C, Matlab, Python. Familiar: Clojure, Scheme, Ruby, Arduino.

**Linguistic**: Fluent in German.

**Design**: SolidWorks, Rhino, NX, and SketchUp CAD. Manual drafting, sketching, L<sup>A</sup>T<sub>E</sub>X.

**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.