

# Hannes G. Daepf

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Citizenship: American & Swiss

## Education

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**Georgia Institute of Technology**, Atlanta, GA

Ph.D. in Mechanical Engineering | Advisor: Dr. Wayne Book | GPA: 4.0/4.0 Expected Dec. 2015

Major Area: Systems and Controls | Minor Area: Robotics

Thesis: "Constrained Model Predictive Control for Compliant Position Tracking of Pneumatic Systems"

M.S. in Mechanical Engineering | Advisor: Dr. Wayne Book

December 2011

Thesis: "Development of a Multi-Platform Simulation for a Pneumatically Actuated Quadruped Robot"

**Tufts University**, Medford, MA

B.S. in Mechanical Engineering | GPA: 3.86/4.00 | *Summa cum Laude*

May 2009

## Skills & Knowledge

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Selected Engineering:	Linear and nonlinear control theory & implementation (including experience with optimal, model predictive, sliding mode, networked, adaptive, feedback linearization, and stochastic control), dynamics & vibration, spectral analysis, optimization, numerical methods, design tools & methods, robotics
Software:	MATLAB/Simulink/xPC Target, LabVIEW, SolidWorks, AutoCAD, Inventor, Microsoft Office, C++, C, FORTRAN, Python, Assembly, html/css, UDP, Visual Basic, $\LaTeX$
Hardware:	Pneumatics, hydraulics, Arduino, myRIO & industrial microcontrollers, CANBus, general machine shop usage (lathe, mill, etc.), 3D printing, laser cutting
Languages:	English (fluent), German (fluent), Swiss German (fluent), French (working knowledge)

## Experience

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**Georgia Institute of Technology**, Atlanta, GA

*Graduate Research Assistant studying control of pneumatic systems* Aug. 2009 - Present

- Developing a model predictive controller to achieve safe, compliant, and accurate position control of pneumatic systems for applications with human/environment interaction.
- Created numerical actuator model in Simulink and coupled with C++/OpenGL simulation of four-legged robot dynamics and environment interaction.
- Implemented user interface to robot hardware using 3-Dof Phantom joysticks with haptic feedback.
- Designed & constructed pneumatically powered test platform & robot components.
- Presented results to R&D leaders from fluid power companies such as Caterpillar, Eaton, & HUSCO.
- Managed three undergraduate students & collaborated with researchers at multiple universities.

**Deutsche Bahn Systemtechnik**, Munich, Germany

*HVAC and Aerodynamics Intern* May - Aug. 2009

- Contributed towards a model to reduce power consumption in train HVAC systems by assessing impact of driving speed on thermal conductivity values.
- Debugged & improved a VBA program to analyze impacts of strong side winds on high-speed trains.
- Constructed test cases to span a maximal range of desired model performance and validated finished model against experimental results.

## **Tufts University**, Medford, MA

*Undergraduate Research Assistant (Senior Thesis Research)*

Sept. 2008 - May 2009

- Studied the application of elastomer molds to jellyfish-inspired underwater propulsion methods.
- Fabricated & tested designs that coupled mold geometries with material properties.
- Modeled system using an analytical radial spring representation and a finite element model.
- Produced design capable of 50% diameter reduction under reasonable radial loading.

## **Virginia Polytechnic Institute**, Blacksburg, VA

*NSF REU Undergraduate Researcher*

June - Aug. 2008

- Modeled earth's atmosphere for the study of global pollution behavior using Weighted Essentially Non-Oscillatory (WENO) schemes to solve the Shallow Water Equations in FORTRAN.

## **Fraunhofer Institute for Material Flow & Logistics**, Dortmund, Germany

*Research Intern*

May - Aug. 2007

- Studied the effects of rollers on the vibrations of a warehouse racking structure.
- Proofread and assisted with German-English translation of several technical documents.

## Teaching

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### **Georgia Institute of Technology**, Atlanta, GA

*Graduate Teaching Assistant for ME 2110: Creative Decisions & Design*

Aug. 2014 - Present

- Mentored student design teams & assisted with engineering requirement development, LabVIEW, myRIO, and mechatronics design.
- Received consistently high ratings in student course reviews, including top marks in course management, concept familiarity, approachability, and overall effectiveness.

## Honors & Awards

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2011 - 2014	National Defense Science & Engineering Graduate (NDSEG) Fellowship
May 2010	NSF Graduate Research Fellowship Honorable Mention
Summer 2009	German Academic Exchange Service (DAAD) RISE Pro Scholarship
May 2009	Tufts University Mechanical Engineering Department O'Leary Design Award
Summer 2007	DAAD RISE Scholarship

## Professional Affiliations

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IEEE, ASME, Tau Beta Pi

## Activities & Interests

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Tufts Symphony Orchestra, Trumpet (13+ years), Travel, Web design, DIY projects

## Selected Publications

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**Daepf, HG** and WJ Book, "Model Predictive Control for compliant pneumatic systems." In ASME 2014 Dynamic Systems and Control Conference, October 22-24, San Antonio (TX), USA (2014).

**Daepf, HG** and WJ Book, "Value of a high fidelity actuator model for dynamic simulation of a pneumatic rescue robot". Proc. of the 19th IFAC World Congress, August 24-29, Cape Town, South Africa (2014).

Chipalkatty, R, **H Daepf**, M Egerstedt and W Book, "Human-in-the-Loop: MPC for shared control of a quadruped rescue robot". IEEE/RSJ IROS 2011, San Francisco (CA), USA, September 25 - 30, 2011.

A more comprehensive overview of publications, research, and project descriptions can be found on my website at <http://www.imdl.gatech.edu/Daepf>.