

# Matthew Peavy, P.E.

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## Education

**Université Libre de Bruxelles** | Mar 08 - Present  
PhD Candidate in Mechanical Engineering, emphasis on computational fluid dynamics and aeroelasticity.

**University of California at Berkeley** | Aug 98 - May 00  
MS in Civil Engineering with an emphasis on non-linear structural analysis.

**Technische Universität Braunschweig, Germany** | Oct 97 - July 98  
Fulbright Scholarship for study and research.

**University of Wyoming** | Sept 92 - May 97  
BS in Civil Engineering with Honors.

**Universität Trier, Germany** | Oct 94 - July 95  
Foreign exchange program (ISEP) through the University of Wyoming.

## Employment Experience

- Programming Engineer** | Nov 00 - Present
- Employed as a programming engineer for bridge analysis and design software. Responsibilities include object-oriented software design, numerical algorithms, graphical user interface design, automated unit and project testing, peer code review, XML / XSLT, and web-site maintenance.
  - Projects include a platform-independent non-linear finite element analysis package, influence analysis and live-load algorithms, sign structure design application, slab bridge design application, and 3-D graphical visualization of structures.
  - Programming emphases include C++, OpenInventor and OpenSceneGraph 3-D graphics, CGI interface, numerical algorithms, and database programming.
  - Experience programming for Windows (Win32 and .NET) and Linux/Unix platforms.
  - Employer: BridgeTech Inc., Laramie, WY.

**Graduate Student Assistant** | Oct 10 - Present

- Employed as a graduate student assistant for undergraduate course work within the Mechanical Engineering department at ULB. Courses consisted of Thermodynamics and Dynamics of Machines. Helped construct and grade assignments, labs, and tests.
- Language: French
- Employer: Université Libre de Bruxelles, ATM Department

**Linux Cluster System Administrator** | Mar 08 - Present

- Employed as a system administrator for two Linux computational compute clusters.
- Responsibilities include system installation and set-up, system administration tasks (back-ups, account administration, etc.), configuration of Sun Grid Engine (SGE) batch-queuing system, and software installation.
- Employer: Université Libre de Bruxelles, ATM Department

**Adjunct Faculty** | Spring Semester, Jan 07 - May 07

- Employed as an adjunct faculty lecturer in the Mechanical Engineering department.
- Course taught: ES 2410, Mechanics of Materials.
- Employer: University of Wyoming, Department of Mechanical Engineering, Laramie, WY.

**Land and Construction Surveyor** | April 00 - July 00

- Employed as a surveyor for construction and general land surveying projects.
- Employer: Nelson Engineering, Jackson, WY.

**Graduate Student Instructor** | Sept 98 - Dec 99

- Employed as an instructor for undergraduate course work within the Civil Engineering department at UC Berkeley. Taught a discussion section and held office hours. Classes included Mechanics of Materials, Structural Analysis, and Timber Design. Helped construct and grade assignments and tests.
- Employer: UC Berkeley, Department of Civil Engineering, Berkeley, CA.

**Fulbright Research Student** | Sept 97 - July 98

- Conducted an independent research project on ultrasound grading of structural timber, consisting of laboratory testing, computer and equipment set-up, data analysis, and technical writing (German and English).
- Employer: Dr. Martin Kessel, Labor für Holztechnik, FH Hildesheim, Germany.

### **Technical Translation, German to English | 1995**

- Contracted to translate two published technical articles from the German engineering journal *Bauen mit Holz* into English. The articles were published in a comparable US magazine.
- Employer: Dr. Richard Schmidt, University of Wyoming.

## **Skills, Certifications, and Awards**

Wyoming Small Business Innovative Research (SBIR) Phase 0 Grant  
Belgian American Education Foundation (BAEF) Fellowship, 2008-2009  
Profession Engineer (Structural), Wyoming License #10248  
Tau Beta Pi engineering honor society, member  
Fluency in German (including translation experience)  
Fluency in French  
Fulbright Fellowship, 1997-1998, Germany

## **Project Descriptions**

### **AASHTO Finite Element Analysis Engine**

- Description: Developed a non-linear finite element engine for AASHTO for use within the Virtis/Opis software package. The engine was designed as an extensible framework for 2 or 3D, beam and continuum elements, material / geometric non-linearities, and large displacement analyses. Testing and enhancement remain on-going.
- Language / Platform: C++, Platform Independent
- Date: Jan 01 - Present
- Client: AASHTO - American Association of State Highway and Transportation Officials

### **KDOT Sign Structure Design and Analysis Program**

- Description: Wrote a sign structure design program for KDOT to replace an existing UNIX-based program. Included a graphical user-interface, interfacing with STAAD for structural analysis, specification checking, XML / XSLT formatted output, and 3D graphical representation of the structure and signs.
- Language / Platform: Visual Basic and C++, Windows
- Date: Dec 00 - Dec 03
- Client: KDOT - Kansas Department of Transportation

### **CRSI Reinforced Concrete Slab Bridge Design Application**

- Description: Wrote a stand-alone application to aid in the design of reinforced concrete slab bridges. The application includes matrix structural analysis code, slab design and rebar selection algorithms, AASHTO live and dead loading with combinations, XML-based save files and reports, and plots of critical values along the beam line. Analysis code is written in standard C++. The GUI employs the cross-platform toolkit wxWidgets, allowing for platform porting in the future.
- Language / Platform: C++, Windows
- Date: Aug 01 - Present
- Client: CRSI - Concrete Reinforcing Steel Institute

### **National Bridge Inventory (NBI) Report Generation**

- Description: Developed a Microsoft Access user interface for the NBI database. Importing of NBI data and corresponding error checking are handled for any year. Data query for report generation is based on material type, construction year, bridge adequacy (structurally deficient and functionally obsolete), length, state, etc. Graphs are generated for specific use cases based on query criteria.
- Language / Platform: Visual Basic, Microsoft Access Database
- Date: Nov 01 - Dec 03
- Client: PCA - Portland Cement Association

### **NCHRP 12-62 Research Project**

- Description: Developing a simplified method for computing live load distribution factors for the *AASHTO LRFD Bridge Design Specifications*. Parametrically generated bridge descriptions are analyzed using the AASHTO structural analysis engine in order to determine a series of influence surfaces. The influence surfaces are loaded with simulated truck loads (combinations of AASHTO trucks) in order to determine maximum actions. Equivalent distribution factors based on this rigorous analysis method are used to calibrate a simplified distribution factor method. The automated manner of bridge generation, analysis, and live loading allows for the investigation of thousands of bridges.
- Language / Platform: C++, Platform Independent
- Date: April 03 - Sept 04
- Client: NCHRP - National Cooperative Highway Research Program

### **BRASS™ Girder UI**

- Description: Developing a graphical user interface for the BRASS™ Girder program. The UI is targeting the Windows .NET platform and relies on managed and unmanaged C++.
- Language / Platform: Managed and Unmanaged C++, Windows .NET
- Date: April 04 - Present
- Client: WYDOT - Wyoming Department of Transportation

### **AASHTO LRFD Bridge Design SpecML Research Project**

- Description: Developed an XML schema and working prototype for presentation of the AASHTO LRFD Bridge Design specification in an electronic format (XML / browser). The XML schema was designed to provide maximum “intelligent” functionality, such as multiple views, hyper-linking within and external to the specification, user defined margin notes, etc.
- Language and Technologies / Platform: XML/XSL, ODF, XUL, JavaScript. Platform independent
- Date: Nov 05 – May 06
- Client: AASHTO – American Association of State Highway and Transportation Officials

### **Solutis On-line**

- Description: Ported the Solutis Finite Element Engine to run on a Unix server. Wrote web interface to facilitate input and output.
- Language and Technologies / Platform: Unix, C++, HTML
- Date: April 04 – Present

### **NBI On-line**

- Description: Created an a dynamic website designed to query a database containing the National Bridge Inventory (NBI) data. Wrote scripts to repopulate database each year. Enabled user to perform a custom query and presented data laid over a Google Map.
- Language and Technologies / Platform: Unix, MySQL, PHP, Google Maps API
- Date: Feb 08 – Present

### **BTBeam On-line**

- Description: Ported the existing BTBeam application to a Unix platform. Wrote a web-based interface to handle user accounts, user input, and present results.
- Languages and Technologies / Platform: Unix, Fortran, PHP
- Date: Jan 09 – Present

## **Rapid Bridge Classification**

- Description: Developed an application to assist with the rapid classification of bridges for structural soundness based on limited information. The application allows selection of user-defined truck convoys as well as individual truck loads. Route selection implemented via an embedded browser within the application. Bridge and vehicle data may be input via the GUI or obtained from a pre-existing database. All I/O is completed in XML-based files. XML / XSLT formatted reports are used to present results. Analysis code is written in standard C++. The GUI employs the cross-platform toolkit wxWidgets, allowing for platform porting in the future. Database connections are made via the ODBC and the Database.
- Language and Technologies / Platform: Windows, C++, wxWidgets, wxWebConnect, XML / XSLT, ODBC and Database Template Library
- Date: Aug 10 - Present
- Client: Army Corps of Engineers

## **Presentations and Publications**

- Peavy, M.D., "Aeroelastic Investigation of Wind-Induced Vibrations of High-Mast Poles," Presentation at NCATM (National Congress on Theoretical and Applied Mechanics), Brussels, Belgium, May 2012.
- Peavy, M.D., "Aeroelastic Investigation of Wind-Induced Vibrations of High-Mast Poles," Presentation at ACOMENS (Advanced Computational Methods in Engineering), Liège, Belgium, November 2011.
- Peavy, M.D., "CRSI Slab Design Webinar Presentation," Web-based Interactive Demonstration and Presentation, Concrete Reinforcing Steel Institute, October, 2006.
- Peavy, M.D., "LRFD Analysis of Reinforced Concrete Bridges," Presentation, Concrete Bridge Conference, Reno, NV, May 2006.
- Peavy, M.D., "CRSI Slab Design Webinar Presentation," Web-based Interactive Demonstration and Presentation, Concrete Reinforcing Steel Institute, May, 2006.
- Puckett, J.A., Huo, X.S., Patrick, M.D., Jablin, M.C., Peavy, M.D., Mertz, D., "Simplified Live-Load Distribution-Factor Equations," NCHRP 12-62, Draft Final Report, National Academy of Sciences, National Cooperative Research Program, March 2005.

- Puckett, J.A., Huo, X.S., Patrick, M.D., Jablin, M.C., Mertz, D., Peavy, M.D., "Simplified Equations for Live-Load Distribution in Highway Bridges," *International Bridge Engineering Conference*, TRB: 6IBECS-069, July 2005.
- Peavy, M.D., "3D Bridge Analysis and Non-Standard Truck Live Loading," Presentation, BRASS/Virtis/Opis Users' Group Meeting, Albuquerque, NM, August 2001.
- Peavy, M.D., "Development of a Flexibility-Based Fiber Frame Element," Master's Thesis, UC Berkeley, 2000.
- Peavy, M.D. and Schmidt, R.J., "Load Bearing Capacity of Timber Connections with Wood Pegs.," *Timber Framing, Journal of the Timber Framers Guild*, (39):8-11, March, 1996. Translation of: Kessel, M. H. and Augustin, R. "Untersuchungen der Tragfähigkeit von Holzverbindungen mit Holznägeln für Sanierung und Rekonstruktion alter Bausubstanz," *Bauen mit Holz*, pp. 484-487, June, 1994.
- Peavy, M.D. and Schmidt, R.J., "Load Behavior of Connections with Oak Pegs," *Timber Framing, Journal of the Timber Framers Guild*, (38):6-9, Dec. 1995. Translation of: Kessel, M. H. and Augustin, R., "Untersuchungen über das Tragverhalten von Verbindungen mit Eichenholznägeln," *Bauen mit Holz*, pp. 246-250, April, 1990.