

# LANCE A. ENDRES, PH.D.

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## Summary

An experienced research and development engineer in the area of computational dynamics and mechanics. Creative thinker with excellent presentation and communication skills. Experience with project management, team leading, and working internationally on team based projects.

## Areas of Expertise

Computational Mechanics • Computational Dynamics • Numerical Integration • Dynamics of Drill Bits • Cutter-Rock Interaction • BHA Dynamics • Data Analysis and Interpretation • Whirl • Software Development • Software Architecture • Programming • Research • Teaching • Technical Writing

## Experience

**APS TECHNOLOGY** - Houston, TX

1/2014 - Current

### *Principal Engineer*

Worked in the area of drilling dynamics, drilling optimization, and data processing and analysis.

- Developed data processing techniques and algorithms. Implemented as a software package used to automate cleaning and processing of drilling data.
- Worked on BHA analysis software to fix software issues and assess and repair scientific issues.
- Developed generalized plotting software designed to work with data from any downhole tool. Software needed to be immune to changes in firmware, easily adapt to new tool output, and error handling for corrupted data. Consisted of a data translation and validation library (custom written) combined with INT's WellLog plotting library.
- Provided recommendations on developing a path to full drilling automation. Contributions included assessing available resources, assessing currently available technology, and determining what technology needs to be developed.
- Developed an architecture for all of the drilling optimization and automation software.
- Taught drilling dynamics and mechanics, object oriented design practices, and .Net Framework.

**BAKER HUGHES** - Houston, TX

1/2006 - 11/2013

### *Researcher in Drilling Mechanics and Dynamics*

Conducted research in the areas of drilling mechanics and dynamics. Work included developing theoretical understandings of drilling behavior, designing laboratory experiments, and developing computer models to predict drilling behavior.

- Developed an advanced, proprietary computational dynamics application used to predict and analyze the dynamic behavior of drill bits, forces acting on cutters, cutting/bottom hole patterns, and AKO kinematics. Was responsible for software design and architecture, algorithms, implementation and accuracy of physics, project schedule, deliverables, and budget. Lead a team based in Russia to continue the development of the software.
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- Served as team member on project with objective to advance understanding of torsional and lateral drilling dynamics through a series of computer, laboratory, and full scale drill rig experiments.
- Developed a laboratory analysis technique to improve understanding of lateral bit dynamics and more precisely define backward whirl.
- Developed new techniques for designing drill bits to prevent lateral vibrations both in the new and worn states.
- Designed and oversaw running of experiments in laboratory setting and on a full scale drill rig.
- Analyzed and interpreted computer, laboratory, and drill rig data.
- Developed software to post process a variety of disjointed laboratory and computer data types in a standardized, uniform way.
- Trained new employees and directed the work of interns.
- Served as a member of a cross-divisional numerical modeling and simulation committee.

**UNIVERSITY OF CALIFORNIA, SAN DIEGO** - La Jolla, CA

9/2002 - 12/2005

***Graduate Student Researcher***

Performed research in the area of computational mechanics and numerical integration.

**UNIVERSITY OF CALIFORNIA, SAN DIEGO** - La Jolla, CA

9/2001 - 6/2002

***Teaching Assistant***

Wrote exams, graded homework and exams, held office hours, and lectured classes when the professor was unavailable. Specifically requested by several students to be their T.A. because of performance as their T.A. in a prior class.

**STRATEGIC ENERGY SOLUTIONS** - Ferndale, MI

11/1998 - 9/2000

***C.A.D. Manager***

Created high quality, professional engineering drawings, conducted training, established and maintained C.A.D. standards, and wrote productivity software for AutoCAD.

## **Education**

**UNIVERSITY OF CALIFORNIA, SAN DIEGO**

2007

***Ph.D. in Structural Engineering***

**UNIVERSITY OF CALIFORNIA, SAN DIEGO**

2004

***M.S. in Structural Engineering***

**LAWRENCE TECHNOLOGICAL UNIVERSITY**

1999

***B.S. in Civil Engineering***

## **Publications**

- [1] L. Endres. Signal segmentation algorithm of Radhakrishnan, et al. ported to C and C#. *Code Project*, online article.
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- [2] L. Endres and P. Krysl. Refinement of finite element approximations on tetrahedral meshes using charms. In *Seventh U.S. National Congress on Computational Mechanics*, Albuquerque, NM, July 2003.
- [3] L. Endres and P. Krysl. Octasection-based refinement of finite element approximations on tetrahedral meshes that guarantees shape quality. *Int J Numer Meth Eng*, 59(1), 2004.
- [4] L. Endres and P. Krysl. Second-order explicit integrator via composition for coupled rotating rigid bodies applied to roller cone drill bits. *Commun Numer Meth Eng*, 24(12):1923–1940, 2008.
- [5] Lanson Adam Endres. *Computation Modeling of Drill Bits: A New Method for Reproducing Bottom Hole Geometry and a Second-Order Explicit Integrator via Composition for Coupled Rotating Rigid Bodies*. PhD thesis, University of California, San Diego, La Jolla, CA, December 2007.
- [6] P. Krysl and L. Endres. Explicit Newmark/Verlet algorithm for time integration of the rotational dynamics of rigid bodies. *Int J Numer Meth Eng*, 62(15):2154–2177, 2005.
- [7] T. Schwefe, L. W. Ledgerwood III, J. R. Jain, D. M. Fuselier, L. Endres, and H. Oueslati. Development and testing of stick/slip-resistant PDC bits. In *SPE Drilling Conference and Exhibition*, Fort Worth, TX, To appear 2014.

### Patents

- [1] Lance A. Endres, Gregory C. Prevost, and Tyler R. Reynolds. *Drill bit with distributed force profile*. U.S. Patent 20130008724, filed June 14, 2012.
- [2] Lance A. Endres, Tyler R. Reynolds, and Gregory C. Prevost. *METHODS OF DESIGNING EARTH-BORING TOOLS USING A PLURALITY OF WEAR STATE VALUES AND RELATED METHODS OF FORMING EARTH-BORING TOOLS*. U.S. Patent 201300835902.
- [3] Andreas Hohl, Mathias Tergeist, Hatem Oueslati, Christian Herbig, Jayesh J. Jain, Hanno Reckmann, and Lance A. Endres. *Method to mitigate bit induced vibrations by intentionally modifying mode shapes of drill strings by mass or stiffness changes*. U.S. Patent 20150122547, filed November 1, 2013.
- [4] Gregory C. Prevost, Lance A. Endres, and Tyler R. Reynolds. *METHODS OF DESIGNING EARTH-BORING TOOLS USING A PLURALITY OF DEPTH OF CUT VALUES AND RELATED METHODS OF FORMING EARTH-BORING TOOLS*. U.S. Patent 20130035903, filed August 5, 2011.

### Other Skills

- Engineering and Research: Design of Laboratory Experiments, Stability Analysis, Signal Processing, Algorithm Design, FEA, Plasticity, and Structural Engineer.
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- Programming: C, C++, C#, .NET Framework, Visual Basic, Fortran, AutoLISP, threading (POSIX and .NET), XML, XPath, XSLT, HTML, XHTML, CSS, Windows Installer XML (WiX), INT's WellLog graphing library, UML, XML Schema Definitions (XSD), PHP, JavaScript, code profiling, and software architecture.
- Microsoft software: Windows, Word, Excel, PowerPoint, Project, Access, and Outlook.
- Other software: Visual Studio, AutoCAD, Matlab, TortoiseSVN/CVS, GitHub, SAP 2000, RISA-3D, iSIGHT, LaTeX, and NX.
- Other: Computer trouble shooting and repair (hardware and software), Basic electronics, Embedded programming, and Soldering.

### **Certifications**

Engineer in Training (E.I.T./F.E. Exam) 1999

### **Affiliations**

**Society of Petroleum Engineers** 2008  
PetroWiki moderator for *Dynamics and Vibrations*.