

# 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

**IKOSY TECHNOLOGIES** - Spring, TX

3/2021 - Current

### *Founder and CEO*

Founded Ikosy Technologies with the goal of bringing easy to use desktop pick-and-place technology to the maker community.

**APS TECHNOLOGY** - Houston, TX

1/2014 - 6/2020

### *Principal Engineer*

Areas of worked included drilling dynamics, drilling optimization, and data analysis.

- Conducted an in-depth review of a proprietary drilling dynamics tool. Review included available hardware sensors, calculations performed by the firmware, data file output, control algorithms, dynamic behavior, and operational usage. The conclusions were documented in a report which detailed the current status, where improvements could be made, and how to proceed with further testing and development of the device.
- Developed data processing techniques and algorithms. Implemented as a software package used to automate cleaning and processing of drilling data.
- Rewrote drill string 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 have 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.

**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.

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- 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.
- 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.

### Education

UNIVERSITY OF CALIFORNIA, SAN DIEGO	2007
<i>Ph.D. in Structural Engineering</i>	
UNIVERSITY OF CALIFORNIA, SAN DIEGO	2004
<i>M.S. in Structural Engineering</i>	
LAWRENCE TECHNOLOGICAL UNIVERSITY	1999
<i>B.S. in Civil Engineering</i>	

### Publications

- [1] L. Endres. Signal segmentation algorithm of Radhakrishnan, et al. ported to C and C#. *Code Project*, online article, June 2015.
- [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, March 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, filed August 5, 2011.
- [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, CFD (basic), plasticity, and structural engineering.
- 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 optimization, and software architecture.
- Software: Visual Studio, AutoCAD, Matlab, TortoiseSVN/CVS, GitHub, iSIGHT design optimization software, LaTeX, NX, Fusion 360, Solid Works, and Ansys.
- Other: computer trouble shooting and repair (hardware and software), basic electronics & circuits, microprocessors (Arduino and Pi), embedded programming, soldering, 3D modeling, additive manufacturing, and lighting displays (smart LEDs).