JOHN P. RODGERS, Ph.D., P.E.

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EDUCATION

Massachusetts Institute of Technology
Cambridge, Massachusetts
Department of Aeronautics and Astronautics

-Ph.D. received October 1998.
Major in Structures Technology and Minor in Estimation and Control.
Thesis Title: *Development of an Integral Twist-Actuated Rotor Blade for Individual Blade Control.*

-Master of Science received May 1995.
Thesis Title: *Modeling and Manufacturing of Adaptive Composite Plates Incorporating Piezoelectric Fiber Composite Plies.*

Duke University
Durham, North Carolina
Department of Mechanical Engineering and Material Science

-Bachelor of Science in Engineering received December 1992.
Graduation with Departmental Distinction
Scholarship Recipient, National Academy for the Advancement of Nuclear Power
-Second major in Mathematics.

AREAS OF EXPERTISE

Knowledgeable in a variety of fields related to mechanical, materials, and aerospace, and downhole engineering, including:

- Structural design and analysis
- Actuation and sensing
- Vibration and noise
- Smart materials
- Manufacturing and QC
- Fluid mechanics and dynamics
- Downhole tool design and test
- Forensic engineering
- Electromagnetics
- Aerodynamics and aeroelasticity
- Structural dynamics
- Active control systems
- Polymer-matrix composites
- Crash/shock survival
- Heat transfer
- Testing and characterization of materials, devices, systems
- Machine design
- Intellectual property
- Instrumentation and sensing

EXPERIENCE

Starboard Innovations, LLC, *President, Founder*
Ridgefield, CT
March 2000-present
Engineering consulting company specializing in concept development, new technology research, design, analysis, prototyping, and testing. Recent projects include:

- Development of multiple downhole oilfield tools and integration of new technologies including sensing, autonomous positioning, explosives safety, acoustic telemetry, remote power generation, vibration mitigation; multi-disciplinary FEA, electromagnetic design; support for field testing and operations; qualification testing for thermal, pressure, shock, explosive operations; strength analysis, damage prediction, and troubleshooting of mechanical systems; downhole equipment operation and design including fracturing equipment, perforating equipment, drilling equipment, wellbore plugging devices, valves; slickline, wireline, coiled tubing, tubing-conveyed, casing-conveyed, and drillstring tools; well completions.
- Development of shock simulation software package and shock sensing downhole tool for predicting, measuring, and optimizing perforating gun string and wellbore dynamics. Prediction of tool string failure under operational loading.
- Participation on multiple failure investigation teams that included extensive simulations and tests to demonstrate causation; successful in reducing client liability in negotiations. Rapid redesign of deficient design elements to enable a return to reliable service.
- Analysis of oilfield rig and surface equipment systems operations, including autodrillers, pipe handling tools, coiled-tubing injectors, umbilical handling, desanders, and produced water evaporators.
- Development and implementation of food production engineering systems for major snack food manufacturer.
- Support for large-scale power grid energy storage system design and installation.
- Litigation support and expert witness for plaintiff and defense involving trade secret, product liability, personal injury, contract disputes, and IP.
- Intellectual property development and research, competitive patent analysis.
- Rotorcraft vibration reduction using active material treatments and integrated on-blade actuation technology for Bell Helicopter (Variable Geometry Advanced Rotor Technology program)
- Crashworthy aircraft seat design using shape memory materials and rotorcraft occupant restraint systems for NASA and Air Force

More information at http://www.starboardinnovations.com

Midé Technology Corporation, *Senior Engineer*
Cambridge, Massachusetts
November 1998-February 2000
Active in technology, product, and business development.

- Co-developer, PowerAct™, a novel piezoceramic actuator/sensor
- Principal Investigator for Air Force-funded research program to develop advanced rotor concepts and team lead for Bell Helicopter Dynamically-Tailored Airframe Structures program

The MIT Active Materials and Structures Laboratory, *Research Assistant*
Cambridge, Massachusetts
May 1995-October 1998

- Project leader for design, manufacture, and hover testing of a Mach-scale active helicopter rotor blade for individual blade control of vibrations and noise
- Developed manufacturing process for and characterized active fiber composite piezoelectric actuators
- Teamed with Boeing as part of Smart Structures for Rotorcraft Consortium
- Aided in design and led implementation of Mach-scaled rotor test stand facility

The MIT Space Engineering Research Center, ***Research Assistant***
Cambridge, Massachusetts
January 1993-May 1995

- Developed a Rayleigh-Ritz model of a composite plate with embedded, anisotropic active materials and acoustic radiation
- Designed, manufactured, and tested adaptive composite plates with active plies

Duke University Department of Mechanical Engineering, ***Laboratory Assistant***
Durham, North Carolina
May 1992-December 1992

- Fabricated and tested a fiberglass wind-tunnel model for measuring airfoil pressure distribution with LabView data acquisition system virtual instrument shell

NASA Langley Research Center, Configuration Aeroelasticity Branch, ***Intern***
Hampton, Virginia
June 1991-August 1991

- Performed aerothermoelastic analysis of a NASP vertical tail using a finite element model

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PROFESSIONAL ACTIVITIES

Licensed Professional Engineer (PE) in mechanical engineering in TX, ND, CT

American Society of Mechanical Engineers (ASME), Associate Member, PE License Review Instructor

Guest Lecturer at Texas Christian University, University of North Texas

Society of Petroleum Engineers (SPE), Member

American Institute of Aeronautics and Astronautics (AIAA), Member

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PUBLICATIONS

Rodgers, J., Glenn, T.S., Serra, M., "Prediction of Gun String Dynamic Failure Risks during Perforating", presented at the North American Perforating Symposium, 2019 NAPS 6.3, Arlington, TX, Aug. 2019.

Anderson, M., Rios, F., Rodgers, J. et al, "The Dynamic Loading Effects of Non-linear Gun Connectors During and After Detonation", presented at the 2018 Latin American Perforating Symposium, Bogota, Columbia, Oct. 2018.

Rodgers, J., Glenn, T.S., Serra, M., Craddock, G.G., "High-Fidelity Finite Element Analysis of Deepwater Gun-Parting Failures", presented at the North American Perforating Symposium, NAPS-46-18, July 2018.

Glenn, T.S., Serra, M., Rodgers, J. et al, "Validation of a Finite Element Simulation of a Downhole Perforating Gun String through Comparison with Data from a New Datalogging Sensor Sub", presented at ASME 2015 Verification and Validation Symposium, May 2015.

Wight et al, "New Shock Sensing Sub Permits Greater Understanding of the Dynamic Response of Perforating Gun Strings", IPS-14-03, presented at the 2014 International Perforating Symposium, May 2014.

Glenn, T.S., Serra, M., Rodgers, J., Wight, J., Zhang, W., Craddock, G.G., Harive, K. "Investigating the Dynamic Three-Dimensional Loading Effects on Perforating Guns Imposed by Shaped Charges – Downhole Evaluation". OTC 24891. Presented at Offshore Technology Conference – Asia, Malaysia, March, 2014.

Craddock, G.G., Zhang, W., Wight, J., Rodgers, J., Glenn, T.S., Serra, M., and Bettenmann, T. "Investigating the Dynamic Three-Dimensional Loading Effects on Perforating Guns Imposed by Shaped Charges". Presented at the International Petroleum Technology Conference, Doha, Qatar, 19–22 January, 2014.

John P. Rodgers, "Energy Harvesting for Powering Remote Sensors and Other Devices", presented at the U. Texas - Arlington Workshop on Piezoelectric Energy Harvesting, Arlington, TX, January 2006.

A. Lengyel and J. Rodgers, "Energy Absorbing Technology for Crashworthy Seats", 61st AHS Annual Forum, Grapevine, TX, June 2005.

M. R. Smith, R. J. Pascal, T. Lee, F. Brad Stamps, M. C. van Schoor, B. P. Masters, C. Blaurock, E. F. Prechtl, J. P. Rodgers, and D. J. Merkley, "Results from the Dynamically Tailored Airframe Structures Program", Proceedings of the AHS 58th Annual Forum, Montreal, June 3-5, 2002.

M. R. Smith, R. J. Pascal, M. C. van Schoor, B. P. Masters, C. Blaurock, E. F. Prechtl, J. P. Rodgers, and D. S. Friedmann, "Dynamically Tailored Airframe Structures Program", Proceedings of the AHS 57th Annual Forum, Washington, DC, May 9-11, 2001.

Douglas B. Weems, Robert C. Derham, Nesbitt Hagood, and John Rodgers, "Structural Modeling of a Rotor Blade Incorporating Active Fiber Composites", Fourth ARO Workshop on Smart Structures, State College, PA, August 16-18, 1999.

J.P. Rodgers and N.W. Hagood, "Hover Testing of a 1/6th Mach-Scale CH-47D Blade with Integral Twist Actuation", Proceedings of the 9th International Conference on Adaptive Structures and Technologies, Cambridge, MA , October 1998.

J.P. Rodgers and N.W. Hagood, "Preliminary Mach-Scale Hover Testing of an Integral Twist-Actuated Rotor Blade", Proceedings of the SPIE Symposium on Smart Materials and Structures, San Diego, CA, March 1998.

J.P. Rodgers and N.W. Hagood, "Design, Manufacture, and Testing of an Integral Twist-Actuated Rotor Blade", proceedings of the 8th International Conference on Adaptive Structures and Technologies, Wakayama, Japan, October 1997.

J.P. Rodgers, N.W. Hagood, and D.B. Weems, "Design and Manufacture of an Integral Twist-Actuated Rotor Blade", AIAA Paper No. 97-1264, Proceedings of the 38th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Kissimmee, FL, April 1997.

J.P. Rodgers, A.A. Bent, and N.W. Hagood, "Characterization of Interdigitated Electrode Piezoelectric Fiber Composites for High Electrical and Mechanical Loading" SPIE Paper 2717-60, Proceedings of the SPIE Symposium on Smart Materials and Structures, San Diego, CA, February 1996.

J.P. Rodgers and N.W. Hagood, "Modeling and Manufacturing of Adaptive Composite Plates Incorporating Piezoelectric Fiber Composite Plies", AMSL Report #95-4, Massachusetts Institute of Technology, May 1995.

J.P. Rodgers and N.W. Hagood, "Manufacture of Adaptive Composite Plates Incorporating Piezoelectric Fiber Composite Plies", Proceedings of the 36th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, New Orleans, LA, April 1995.

A.A. Bent, N.W. Hagood, and J.P. Rodgers, "Anisotropic Actuation with Piezoelectric Fiber Composites", Journal of Intelligent Material Systems and Structures, Volume 6, No. 3, pp. 338-349, 1995.

J.P. Rodgers, "Applications of Active Actuator Materials for Adaptive Satellite Structures", MIT Course Handout, December 1994.

J.P. Rodgers, "Aerothermoelastic Analysis of a NASP-Like Vertical Fin", Proceedings of the 33rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Dallas, TX, April 1992.

US PATENTS

10465498 – Fast test application for shock sensing subassemblies using shock modeling

10337320 – Method and systems for capturing data for physical states associated with perf.

10337299 – Perforating apparatus and method having internal load path

10161723 – Charge case fragmentation control for gun survival

10151152 – Perforating gun connectors

10138718 – Perforation crack designator

9909408 - Protection of electronic devices used with perforating guns

9909384 - Multi-actuating plugging device

9598940 - Perforation gun string energy propagation management system and methods

9447678 - Protection of electronic devices used with perforating guns (8978817*)

9091152 - Perforating gun with internal shock mitigation

9051812 - Through tubing bridge plug and installation method for same (10024132*)

9019798 - Acoustic reception

8985200 - Sensing shock during well perforating

8978817 - Protection of electronic devices used with perforating guns

8978749 - Perforation gun string energy propagation management with tuned mass damper

8893801 - Method and apparatus for pressure-actuated tool connection and disconnection

8881816 - Shock load mitigation in a downhole perforating tool assem.
(8714252*,8714251*)

8714270 - Anchor assembly and method for anchoring a downhole tool

8555959 - Compression assembly and method for actuating downhole packing elements

8490686 - Coupler compliance tuning for mitigating shock produced by well per. (8393393*)

8408286 - Perforating string with longitudinal shock de-coupler (8397800*)

8397814 - Perforating string with bending shock de-coupler

7781939 - Thermal expansion matching for acoustic telemetry system (7557492*)

7595737 - Shear coupled acoustic telemetry system

7363967 - Downhole tool with navigation system

7325605 - Flexible piezoelectric for downhole sensing, actuation and health mon (7234519*)

7322416 - Methods of servicing a well bore using self-activating downhole tool

7246660 - Borehole discontinuities for enhanced power generation

*Denotes additional patents in same family.