



ROMAC

ROTATING MACHINERY and CONTROLS LABORATORY



UNIVERSITY of VIRGINIA
SCHOOL of ENGINEERING & APPLIED SCIENCE

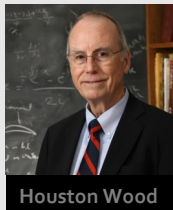
ROMAC ANNUAL MEETING
JUNE 19-23, 2017

SPRING 2017

ROMAC NEWSLETTER

SPECIAL POINTS OF INTEREST

- ROMAC Memberships and Research Projects
- 2017 ROMAC Annual Meeting
- 2017 Summer Short Course
- Visiting Scholars
- New Software Released
- ROMAC Advisory Board
- Proceedings and Publications
- Looking Ahead 2018



Houston Wood

From our Director

Since our Fall 2016 newsletter we have been very busy in the ROMAC lab. First, let me take a moment to thank those members that benefited from the **5% pay on time discount** offered on the 2017 ROMAC membership fee. If you have not yet paid this year's membership fee, please note that your payment is now overdue. Please pay the non-discounted rate of \$28,500 by May 31, 2017. Also note that now is the time to register for the 2017 ROMAC Annual Meeting, taking place June 19-23 in Staunton, Virginia. [A registration form can be found here.](#) We are working on the presentation schedule and we still have a few open slots for research presentations from industry members. Please consider giving a presentation at the meeting and contact

us at romac@virginia.edu if you have a presentation you are interested in including. Also note that the one-day workshops, which we have held in the past few years on the Monday of the annual meeting **will not** be taking place this year. See page 2 for information on the Five-Day Short Course scheduled for July 17-21.

This year we received a wide array of fine potential new students in our ROMAC student applicant pool. Several students were invited to visit the lab in February. Offers have been extended to the best and the brightest and we will welcome two new students this summer and one in the fall.

Our students are busy this semester with classes, research, preparing papers, and attending conferences. In addition, a num-

ber of students are working hard on completing their degrees with plans to finish in August or December of this year.

During the semester break in December 2016, the main ROMAC office received a much needed face lift, courtesy of UVA Facilities Funds. We have newly painted walls, new lighting and ceiling tiles, and some new cabinetry in the conference room. This work has gone a long way to freshen up the lab after too many years to count...but from evidence found while cleaning things out, it has been a very long time.

All of us in the ROMAC lab look forward to seeing you in June.



2016 ROMAC Annual Meeting
Pictured: C. Watson, D. Griffin, T. Gresham, N. Morgan, and M. Branagan

Have you seen the ROMAC Video ?

[Click Here](#)



ROMAC Memberships and Research Projects

We are pleased to welcome our latest ROMAC member company: GE Triveni, a joint venture between GE Oil & Gas and Triveni, Ltd. In addition, we have had several other recent inquiries about ROMAC membership. In conjunction with the ROMAC Advisory Board, we are continuing to work on developing a small business model, which will enable smaller companies to join ROMAC, while maintaining the fundamental

founding principles of ROMAC.

We expect several new members to participate in the meeting in June. If you are aware of a company that may be interested in learning more about ROMAC, our research, and software please pass that information on to us and we will contact them.

We are in the process of signing contracts for two new research projects through UVA's Office of

Sponsored Programs. In addition, we are actively working on developing proposals for external funding in the areas of:

- Turbomachinery & Big Data Analytics
- Energy Futures: towards a more efficient, sustainable, distributed, dynamic, distributed, and resilient power system
- Nanoparticle-Embedded Lubricants



2017 Annual Meeting



The member only ROMAC Annual Meeting will take place at the Stonewall Jackson Hotel located in Staunton, Virginia, in the Shenandoah Valley. The meeting will begin on Monday, 6/19 with a welcome reception at 6:30 pm and conclude on Friday, 6/23 at noon. Please make your hotel reservations individually with the Stonewall Jackson Hotel by June 1, 2017.

The recently formed ROMAC Advisory Board will meet with members of UVA's School of Engineering and Applied Science Monday afternoon, prior to the welcome reception at the Hotel. Note: there will not be a one-day workshop on Monday this year.

- There will be five technical sessions (Rotordynamics, Bearings, Seals and Optimization, Test Rigs, and Magnetic Bearings). Each session will include a number of technical presentations reporting on research activities conducted over the past year. In addition, there will be a number of technical presentations by member company representatives. There are still a couple of time slots available, so please consider giving a presentation at this year's meeting. If you are interested, please contact us as soon as possible at romac@virginia.edu.



2017 Summer Short Course

This year the ROMAC Five-Day Rotordynamics and Magnetic Bearing Short Course will take place July 17-21 in the ROMAC Lab at the University of Virginia, School of Engineering and Applied Science, in Charlottesville VA.

This course is open to both ROMAC members and non-members. A wide variety of topics are taught by industry experts, ROMAC faculty, researchers, and Ph.D. students.

Additional details and a registration form can be found [here](#) on the ROMAC website. If you have questions please contact [Lori Mohr Pedersen](#).

Visiting Scholars

The ROMAC faculty, students, and staff are currently hosting five visiting scholars with a variety of backgrounds. Some of our visitors will be presenting at the annual meeting.

Mr. Tomohiko Tsukuda is a steam turbine engineer with the Toshiba Corporation, Turbo Machinery Group of R&D in Yokohama, Japan. His research is in fluid dynamics of turbomachinery with an emphasis on steam turbine bearings and seals. Baby girl Yuri (Lily) joined him and his wife Nozomi in October 2016. His appointment is through October 2017.

Renat Badykov is a Ph.D. student from the Samara State Aerospace University in Russia. He is a Fulbright Scholar focusing his research on the dynamic process of dry gas face seals. He plans to complete his studies upon his return when his appointment ends in October 2017.

Mr. Kazushige Kuwazuru is a Plant Commissioning and Start-up Engineer with Mitsubishi Hitachi Power Systems, Ltd. in Takasago, Japan. He has a Master's degree from Waseda University, Tokyo. His experience is in commissioning electrical power plants. He is joined by his wife Ayumi and two year old daughter, Kasumi. His appointment ends early December 2017.

Dr. Cheng Liu has been with us since January 2016. He is currently a Research Associate in the National Key Laboratory of Vehicular Transmission, School of Mechanical Engineering, Beijing Institute of Technology having received his Ph.D. in March 2015. His research centers on torque conversion. He and his wife Ning Shen just welcomed their first child, Emily on March 26, 2017. His appointment is through early-January 2018.

Dr. Hui Liu is a professor and the Director of the Vehicle Engineering Department at the Beijing Institute of Technology where she received her education, completing her Ph.D. in 2003. Her research is focused on the design method and theory of vehicle transmission and NVH technology of chassis. She is here with her nine year old son, Xinrui. Dr. Liu's appointment is through mid-March 2018.

ROMAC FUN FACT

Since June 2014 ROMAC has welcomed 24 visiting scholars from six different countries with a duration of visiting appointments from four months to two years.

New Software Released

RotorLab+ v4.1 was released on March 7, 2017. This latest version, which can be downloaded from the [ROMAC Software Catalog](#) website, includes:

- New built-in materials for rotor models
- New Response Summary output for API analyses
- New “Real” Probe feature for API analyses
- Enhancements to plots and plotting options in all analyses
- Bug fixes for disk handling options, API Forced Response analyses, and other minor bugs reported in v4.0.
- Improvements to analysis speeds and overall program stability.

Stay tuned for other releases planned for the coming months including RotorLab+ 4.2 (featuring multi-level shaft capabilities), RotorGUI 2.0 (featuring multiple code enhancements), and a new squeeze film damper code MAXSFD.

ROMAC Advisory Board

The ROMAC Advisory Board held their second meeting on April 20th . The agenda for the meeting was as follows...

ROMAC Advisory Board Meeting Agenda

1. ROMAC position interview progress/status
2. Annual Meeting – overview and industrial talks
3. Business Unit Membership Decision
4. Small Business discount – options & discussion
5. Advisory Board Meeting with SEAS before Annual Meeting – planning & discussion
6. Advisory Board Assignments

The Minutes from this meeting can be accessed on the ROMAC [website](#). The Advisory Board will hold their next meeting on the Monday of the week of the Annual Meeting (June 19th). During this time, the board will be meeting with the Chairman of the Mechanical and Aerospace Engineering Department as well as with representatives of the School of Engineering and Applied Science. If you would like to contribute agenda items to be discussed with the MAE and SEAS representatives during this meeting, please send your requests to [Lori Mohr Pedersen](#) and/or directly to one of the Advisory Board members no later than June 12, 2017.

Upcoming Proceedings and Publications

The following ROMAC students and visitors will present papers at the ASME Turbo Expo 2017: Turbomachinery Technical Conference and Exposition in Charlotte, NC, June 26-30, 2017.

Cori Watson will present Watson, C., and Wood, H. “Optimizing a Helical Groove Seal with Grooves on Both the Rotor and Stator Surfaces.”

Michael Branagan will present Branagan, M., Morgan, N., Weaver, B., and Wood, H., " Response Surface Mapping and Multi-Objective Optimization of Tilting Pad Bearing Designs."

Brad Nichols will present, Nichols, B., Fittro, R. L., and Goyne, C. P., “Subsynchronous Vibration Patterns Under Reduced Oil Supply Flow Rates,” also to be published in the ASME Journal of Gas Turbines and Power.

Benny Schwartz will present Schwartz, B., Fittro, R., and Knospe, C., “Understanding the Effect of Systematic Errors on the Accuracy of Experimental Measurements of Fluid-Film Bearing Dynamic Coefficients.”

Wisher Paudel, currently a mechanical engineering 4th year student working in the ROMAC Lab, is one of our incoming graduate students. He will present Paudel, W., Watson, C., and Wood, H., “Mixed Helical Labyrinth Seal Optimization Using Computational Fluid Dynamics.”

Tomohiko Tsukuda, a ROMAC visiting scholar, will present a paper, Tsukuda, T., Hirano, T., Watson C., Morgan, N., Weaver, B., and Wood, H., “A Numerical Investigation of the Effect of Inlet Preswirl Ratio on Rotordynamic Characteristics of Labyrinth Seal.” In addition, Weaver, B., Tsukuda, T., Rizvi, S.A.A., Schwartz, B., Nichols, B., Griffin, D., Branagan, M., Fittro, R., Lin, Z., Wood, H., “Experimental Measurements of Turbomachinery Rotordynamics, Component Performance, and Dynamic Control at ROMAC – A Review,” will be published in the Journal of Gas Turbine Society of Japan (JGTSJ, ISSN-0387-4168), July 2017.

Cori Watson and Michael Branagan won the ASME Turbo Student Advisory Committee Travel Award 2017

Looking ahead....

**ASME Turbo takes place in Oslo, Norway
June 11–15, 2018**

**The 2018 ROMAC Annual Meeting
will either be June 4–8 or June 18–22
in Charlottesville, Virginia**

June 2018





ENGINEERING

Department of Mechanical and
Aerospace Engineering

Rotating Machinery and Controls Laboratory

Areas of Expertise and Current Research

- **Software Development and Test Rig Validation**
- **Finite Element Analysis (FEA)**
- **Computational Fluid Dynamics (CFD)**
- **Fluid Film and Rolling Element Bearings**
- **Rotordynamics**
- **Seals**
- **Squeeze Film Dampers**
- **Magnetic Bearings and Controls**
- **Optimization of Rotor-Bearing Systems**
- **Experimental, Computational, and Theoretical Studies**

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