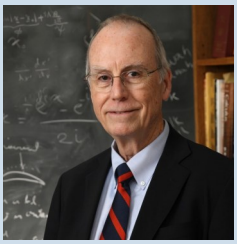
UVA

SCHOOL of ENGINEERING & APPLIED SCIENCE
Department of Mechanical and Aerospace Engineering
Rotating Machinery and Controls Laboratory

ROMAC NEWSLETTER

SPRING 2021


Houston Wood

2021 ROMAC ANNUAL MEETING WILL BE AVAILABLE TO VIEW ON LINE JUNE 21—JULY 2 2021

Register here to receive the information on how to join us.

SPECIAL POINTS OF INTEREST

Loss of Scan DeCamillo

ROMAC 2021 Graduate

ROMAC Software Update

From our Director

The past year has been difficult for all in a variety of ways. In February we learned the very sad news of the passing of long time ROMAC member, Scan DeCamillo. You'll see more about Scan and his dedication to ROMAC on the next page, and don't miss the tribute to Scan at the ROMAC Annual Meeting on line later this summer.

The faculty, students and staff of the ROMAC labs continue to work remotely from our homes. Students continue their classes, all classes are offered on line, as well as their teaching assistant assignments, some in person, some not. Our research continues, fortunately, being mostly engaged in computational research we have had few interruptions during the pandemic.

We had hoped the COVID-19 pandemic would be in the past and we would be preparing to welcome you to Charlottesville for the 2021 ROMAC Annual Meeting. instead please register for the online meeting.

2021 On-Line ROMAC Annual Meeting
Talks will be available June 21— July 2, 2021

Register for the 2021 Annual Meeting

If you have questions please contact: Lori Mohr Pedersen

Jeff Bennett defended his dissertation and will be graduating in May. We expect to see other students finishing their studies in the next semester or two, and look forward to additional students joining the lab to continue our ROMAC members' research interests.

According to recent information received, UVA is planning to return to normal activities on Grounds for the fall 2021 semester. The UVA Coronavirus Information website is available here.

We hope you and yours have remained well.

Houston Wood

Director, ROMAC Lab

ROMAC Remembers Scan DeCamillo

With profound sadness we share the loss of Scan DeCamillo on February 23, 2021. Scan was a long time member of the ROMAC Consortium, a 45 year employee of Kingsbury, Inc. and beloved by family, friends and colleagues. A full obituary can be seen here.

Mike Brawley, President & CEO of Kingsbury, Inc. memorialized Scan on the Kingsbury website homepage. *"Scan was a pioneer in fluid-film bearings, and his achievements include new and modified products that extended the applicable range of those bearings, as well as the accurate prediction of their performance. Scan's career at Kingsbury spanned more than 45 years, and throughout that time, he had an insatiable curiosity and passion for knowledge. From bringing Kingsbury's bearing prediction capabilities into the computer age in the 1970s and 1980s, to his renown throughout the industry and around the world, Scan's impact on our Company, our Industry and on everyone he worked and interacted with is unforgettable."* His full statement can be seen here.

Scan served the industry and made a great impact with his knowledge and skills. He was an engaged member of ROMAC, in many areas as well as a participating in annual meetings, and ROMAC short courses, sharing his expertise in the areas of fluid film bearings, journal bearings, and THPAD and MAXBRG ROMAC software with many ROMAC members as well as faculty and students. Scan's smile, joyful greetings, and sense of humor will be missed by all associated with ROMAC.

Scan's wife Marcia often accompanied him to Charlottesville

A ROMAC tradition when in Charlottesville, have dinner at the Aberdeen Barn

2021 Graduates

Jeffrey Bennett successfully defended his Ph.D. dissertation: ***Trade-offs between emissions, cost and resilience in emerging technologies supporting deep decarbonization of the electric grid.***

Jeff was a student in the Engineering Systems & Environment and an advisee of Andres Clarens. Later this summer he and his wife Lisa, UVA Law'21, will be relocating to the Detroit, Michigan area where Jeff will be working with a start up company and Lisa will work in immigration law.

Spring 2021 Software Update

RotorLab+ 4.5 was released since the fall update and RotorLab+ 4.6 is being released this week. These latest versions contained the following feature improvements and updates:

RotorLab+ 4.6 Updates

- Corrected the API Project Stability Analysis to use the maximum continuous shaft speed instead of rated shaft speed.
- Adjusted labeling for shaft speeds in the shaft input GUI to improve clarity of intent for the user input boxes.
- Reduced the default minimum search frequency range value for the critical speed map analyses to improve solution robustness.
- Added hint to make it more obvious that Log-Dec X Cross-Coupling plots require user selection of cases to plot.
- Removed pop-up text window when copying a figure.
- Added a context menu option to all analysis right click context menus to navigate in windows explorer to the folder containing the text input and output files generated by the analysis code.

RotorLab+ 4.5 Updates

- Updated Documentation for RotorLab+ general model creation and API Spec Check Projects.
- Updated Compressor API Example Project.
- More summary information is now included in the "Nodes" tab that previously contained only global node information.
- Minor updates to GUI labeling and phrasing.
- Bug fixes and stability improvements.
- Improved warnings and error displays.

Ongoing plans for future software releases this year:

RotorLab+ 5.0 will include the initial inclusion of RotorSol into RotorLab+ along with a few other improvements also listed below:

- Lateral mode analyses will be included to duplicate existing functionality from CrtSpd2, For-stab, and Rotstab.
- No existing features will be removed.
- SmoothSeal, Seal4 and Laby4 will be included in version 5.0 with a single new user input GUI to streamline the analysis of annular pressure seals.

Axial and Torsional mode analyses are scheduled for validation testing and inclusion following the 5.0 release. These features will be included in future 5.X versions.

Additionally, Maxbrg+ will be released within RotorLab+ by the end of the year to include new analysis options. New features and improvements in Maxbrg+ include:

- Half Bearing Model when Applicable
  - ◊ Improves computational speed
- Mesh Determination from Grid Adaptive Method
  - ◊ Improves computational speed
- Turbulence Modeling with Prandtl's equation
  - ◊ Removes need for cutoff Reynolds numbers
- Iteration on Film Shape with Genetic Algorithm
  - ◊ Improves computational speed
- Thermal Modeling with Conduction-Convection Method
  - ◊ Remove hot oil carry-over factor
  - ◊ Improves computational speed
- 3D Thermal and Deformation Modeling
- Axial Journal Misalignment
- Axial Edge Starvation
- More physically realistic based on CFD Trial Features For:

  Direct Lubrication

  Ram Effect

As part of our ongoing plans for improving the user experience, the RotorLab+ documentation is being updated. These updates will include features listed below.

- Clear descriptions and figures to relate each component input to physical system.
- Short Tutorials with clear time requirements and learning goals for each bearing and seal component analysis and for simple assembly analyses.
- Troubleshooting guides for each analysis type to handle simple convergence, user input, and stability issues.
- The next documentation to be updated will cover bearing analysis in RotorLab+.
- Subsequently, each individual analysis code will have it's manual updated.

UNIVERSITY of VIRGINIA

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 Bearings
- Rotordynamics
- Seals
- Squeeze Film Dampers
- Magnetic Bearings and Controls
- Optimization of Rotor-Bearing Systems
- Experimental, Computational, and Theoretical Studies

University of Virginia

ROMAC Laboratory and Consortium

Mechanical & Aerospace Engineering

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