

Special T25/ERC Newsletter

Featuring Alumni Activities

This Newsletter is for T25/ERC Friends and Alumni

by Professor Rolf Reitz, ERC director



This Special *T25/ERC Newsletter* is in response to numerous requests from T25/ERC friends and graduates for more information about recent events, and for more news about the activities of past Engine Research Center graduates. Regular ERC newsletters typically focus on our current students and their research accomplishments. Thanks are due to Phil Myers and several of his former students for providing news of T25/ERCers in this letter.

The ERC faculty (and, I know, especially Phil!) are very proud to reflect on how many former T25/ERC friends and students have achieved positions of prominence in industry and academia. Many serve as company managers and leaders of professional societies. This newsletter notes that many T25/ERCers have had significant involvement with the Society of Automotive Engineers. We can boast 26 SAE Fellows, 5 former (and the current) SAE Presidents, and numerous members of the SAE Board of Directors among our graduates.

The SAE Annual Congress is still a major event for current ERC students, staff and faculty. Using interest accrued from the Myers-Uyehara fund (a fund initiated by T25/ERC friends and graduates on the occasion of Phil and Otto's retirements), current ERC graduate students attend and present papers at the congress each year. This year more than 50 ERC students and staff went to Detroit for a total cost of about \$19,000. The Myers-Uyehara fund is also used to support a variety of ERC infrastructure-related expenses (e.g., office equipment and specialized laboratory equipment maintenance), and for new initiatives—such as the new ERC Undergraduate Research Fellowship. This award provides Mechanical Engineering undergraduates the opportunity to engage in engine research projects (and supplies a \$100 honorarium). Five URF projects were completed this semester on the following topics: "An Experimental Carburetor Model to Investigate Two-Phase Flow" by Matthew Pejsa; "An EES model of two-phase fluid flow in Carburetors" by Donald Toyne; "Determination of Diesel Injector Nozzle Characteristics Using Two-color Optical Pyrometry" by Michael Frank; "Flame Length Measurements in a Small-scale Swirl Burner" by John Filipa; "Progress Towards Scalar Velocimetry in Gas-Phase Flows" by Charles Kopplin; and "Determining Discharge Coefficients Through Experimental Procedure" by Chris Mulhall and Anton Kozlovsky.

We hope to continue publication of this T25/ERC special newsletter as a regular feature. To make this happen, we request that you send us news items about your recent activities (e.g., any publications or just a "hi!") to share with your fellow T25/ERCers. The Special T25/ERC Newsletter will also be available on our website.

Former T25/ERCers visiting us never fail to express amazement at the changing face of the Engineering campus. New construction during the past 10 years includes Engineering Hall, the Aquinas fountain, the new Lot

17 parking structure, and the almost-completed Centers building (now occupying the site of the WW-II “temporary” T25 building). The Engineering Centers building will also house the Myers Automotive Laboratory—a dedicated facility devoted to the Mechanical Engineering undergraduate car projects that have won so many awards in recent national competitions (SAE Formula, Baja and FutureTruck). The next looming building project is the \$40M Mechanical Engineering Renovation. Fundraising by the College and Mechanical Engineering Department is actively in progress to match the State of Wisconsin’s investment in this project. Several T25/ERCers have begun a fund-raising initiative for the specific purpose of a T25/ERC Conference Room facility in the new ME building. Looking back, it seems that not a day passes these days without the need to negotiate through muddy construction sites.

We have also been busy constructing the ERC website: <http://www.erc.wisc.edu>

In addition to news about special events, seminar offerings and student pages, the website offers a complete listing of all T25/ERC MS and PhD thesis titles and abstracts going back to the 40’s. This body of information serves as a valuable resource to our current students, and hard copy versions of most of these theses are located in our library, ERB Room 1016C.



An artist's conception of the planned Mechanical Engineering building renovation.

An Historical Perspective of the T25/ERC

T-25 Students Worked in a Post-WWII Temporary Building

Engine research began at UW-Madison during the 1930s with the construction of the Mechanical Engineering building. During World War II, two instructors, Phil Myers in mechanical engineering and Otto Uyehara in chemical engineering, developed a new instrument capable of measuring rapidly varying combustion temperatures in diesel engines. In recognition of that accomplishment, in 1947 the UW Graduate School gave a grant of \$50,000 (\$10,000 per year for five years) to Myers (1947) and Uyehara (1945), who until then had been working in a tin shack within the energy lab of the ME building. The College of Engineering contributed T-25, a war-surplus “temporary” building to house their laboratory. T-25 was the focal point for engine research at the UW-Madison until 1969 when activities moved to the newly constructed Engineering Research Building, and the T-25 structure was torn down. By that time, nearly 100 graduates had been trained in T-25.

Over the succeeding years, the laboratory increased the number of faculty and graduate students. The awarding of the ARO (Army Research Office) Center of Excellence grant in 1986 allowed the scope of research to expand to many related topics and marked the facility’s official transition to the Engine Research Center identity.

Current ERC faculty and principal investigators are Rolf Reitz, Pat Farrell, Dave Foster, Chris Rutland, Jaal Ghandhi, Michael Corradini, and Scott Sanders. Professors Uyehara and Myers have retired, but Myers remains actively involved in the center along with other professional commitments.

Syed Shahed (PhD'70) is SAE President for 2002

Syed Shahed is the latest of five T-25/ERC members to assume the role of president of the Society of Automotive Engineers. Shahed, who is presiding over SAE for the year 2002, received his mechanical engineering PhD degree through the ERC in 1970, working with Professor Phil Myers on his thesis "The Kinetics of Nitric Oxide Formation in High Pressure Combustion Processes."

Previous ERC alumni who have served as SAE president are Phil Myers (1968); John Beck, serving in 1982; Gordon Millar (1984), Rodica Baranescu (2000).

Shahed grew up in India in a family of six children who received their early education through the local Catholic Mission school. He went on to earn his B.S. in 1966 from Osmania University in Hyderabad, and then came to the University of Wisconsin for graduate school. The next stop for Shahed was teaching at the University of California at Berkeley, and after that, a job at Cummins in Columbus, IN, where he rose through the ranks from senior engineer to executive director over the course of 18 years. His work there included development of mathematical modeling methods of the diesel combustion process, emissions measurement and control technology, and high-horsepower engines.

Next, it was on to San Antonio, TX, for seven years at the Southwest Research Institute doing contract research and development for diesel and gasoline engine emissions control technology. Six years ago, Shahed joined Garrett Engine Boosting Systems, a business unit of Honeywell in Torrance, CA, just outside Los Angeles. There he is currently vice-president of Advanced Technology, responsible for the development of advanced air management systems for boosting diesel and gasoline engine performance, fuel economy, and emissions control.

Phil Myers was SAE president in 1968. He earned his Ph.D. from the University of Wisconsin-Madison in 1947 and never left. A founding member of T-25, along with Otto Uyehara, Emeritus Professor Myers continues an active involvement with the ERC and with national associations and consulting.

N. John Beck, SAE president in 1982, lives in Bonita, California. He earned his Ph.D. in mechanical engineering from the University of Wisconsin in 1952 with a thesis entitled "Temperature Measurements from Absorption Spectra." By 1975, he had established his



Shahed received the UW College of Engineering Distinguished Service Award last year.

own engineering and management consulting firm, BKM, Inc. in San Diego.

Gordon Millar, SAE president in 1984, also earned his doctorate in mechanical engineering from the UW in 1952. His research was in "Flame Temperature Measurements as an Aid to Internal Combustion Engine Analysis." At the time of his SAE presidency, he was vice-president of engineering for Deere & Company. Millar now enjoys retirement in Daytona Beach, Florida.

Rodica A. Baranescu, SAE president in 2000, now lives in suburban Chicago where she is chief engineer for Engine Engineering for International Truck & Engine Corporation. Born and educated in Bucharest, Romania, Baranescu immigrated to the United States in 1979 and worked with Professor Phil Myers at the ERC.



Illustrious ERC alumni gathered in August 2001 at Syed Shahed's California home. Seated are Otto Uyehara, Phil Myers, and Simon Chen. Behind Uyehara is John Beck and standing to the right is Pat Flynn.

T25/ERC Alumni Continue Research Accomplishments Throughout Their Careers

Call for papers: You are invited to submit research paper titles and abstracts for inclusion in future T-25/ERC Newsletters. Send them to the Editor as e-mail attachment: gawenda@engr.wisc.edu or by mail to ERC, 119 Engineering Research Building, 1500 Engineering Drive, Madison, WI 53706.

“Gas Engine Combustion Principles and Applications,” **Simon K. Chen** (PhD’51) and **N. John Beck** (PhD’52), SAE paper 2001-01-2489.

ABSTRACT: Modern commercial dual fuel engines operating in gas mode have the same level of fuel efficiency as in the diesel mode. The NO_x emissions level is reduced ten-fold and satisfies the most stringent European 1/2 TA-Luft regulation. THC emissions can be controlled by the oxidation-catalytic process. High efficiency low NO_x emissions gas engine performance is achieved by the following:

- Same power cylinder components as the basic diesel
- Retarded timing together with short heat release duration by using Micropilot/Microcup designs
- Lean lambda of 2.0 to 2.2
- Minimal pilot fuel, 1% or less
- Centrally located ignition if practical
- Low air charge temperature at high load for high BMEP
- 20-30% lower lambda at part load (compared to full load) achieved by compressed air bypass, skipfire, or variable geometry turbo.

This paper provides only a qualitative treatise on gas engine combustion and the effects of fuel quality and engine design on combustion. Additional research is warranted.

“Minimum Engine Flame Temperature Impacts on Diesel and Spark-Ignition Engine NO_x Production,” **Patrick F. Flynn** (PhD’71), Gary L. Hunter, Russell P. Durrett, Lisa A. Farrell, Wole C. Akinyemi, SAE paper 2000-01-1177.

ABSTRACT: Empirical and analytical data on the minimum possible flame temperatures for combustion processes rapid enough to be effective for engine operation are presented. The fundamental basis for these minimum temperatures is explored with chemical kinetic analysis. The combination of these minimum temperatures and the time scales associated with engine processes yield minimum possible levels of in-cylinder NO_x production for both diesel and spark-ignition engines. These minimum NO_x levels are identified and validated empirically. Legislated NO_x levels lower than those indicated will require exhaust aftertreatment in addition to in-cylinder combustion control.

Your T25/ERC Colleagues Who Are SAE Fellow Grade Members

Rodica Baranescu
N. John Beck
Gary L. Borman
Patrick F. Flynn
Hiroyuki Hiroyasu
Roger B. Krieger
Samuel S. Lestz
Shin Matsuoka

James W. Mohr
Phillip S. Myers
Shunichi Ohigashi
Rolf D. Reitz
Otto A. Uyehara
Norman H. Beachley
James E. Bennethum*
Simon K. Chen

David E. Foster
John H. Johnson
George G. Lassanske
Jay K. Martin
Gordon H. Millar
Tadashi Murayama
Henry K. Newhall
Ather A. Quader

Syed A. Shahed
James Wesley Walker

*deceased

Where Are They Now? We have gathered information about the following alumni of T-25 and the ERC. If you wish to share information about other alumni, or yourself, for a future newsletter, please send it to the ERC at 119 Engineering Research Building, 1500 Engineering Drive, Madison, WI 53706 or by e-mail to reitz@engr.wisc.edu.

Gary Borman (MS'57, Ph.D.'64) is an emeritus professor from the ERC and lives in Madison

Marshall Burrows (Ph.D.'59) is deceased.

Simon Chen (Ph.D.'51) lives in Madison, WI and runs PEI Consultants, aka Power and Energy International Inc

Mohamed El-Wakil (Ph.D.'49) is an emeritus professor from the UW-Madison Mechanical Engineering Department, and he frequently comes in to campus.

David Foster (MS'75) went on to get his Ph.D. at MI and is now a professor in the ERC

B.K. (Bud) Ghandhi (Ph.D.'57) is retired from Outboard Marine and teaches at Milwaukee School of Engineering.

Jaal Ghandhi, son of Bud Ghandhi (PhD'57) received his MS ('88) at the ERC and his Ph.D at Princeton and is now an associate professor with the ERC.

Bhagwan Gulrajani (MS'58) is a retired professor in California

Jerry Haft (BSME'54) is retired from Outboard Marine and lives in Door County Wisconsin where he raises cherries

John Johnson (MS'60, Ph.D.'64) is a professor at Michigan Tech in Houghton, Michigan. He and ERC Emeritus Professor **Phil Myers** (Ph.D.'47) were two of the 13 authors of the controversial, Congressionally-requested, NRC report entitled "Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards." The findings and recommendations of the report, along with its supporting documentation, were much quoted and disputed during the Congressional discussions of automotive fuel consumption standards. Copies of this 163-page publication can be obtained from the National Academy Press. Johnson has also just been awarded the Soichiro Honda Medal which will be presented in November at the ASME International Mechanical Engineering Congress.

Roger Krieger (Ph.D.'68) works at GM Research in Michigan

Gordon Millar (Ph.D.'52) retired as a vice president of John Deere and now lives in Daytona Beach, Florida.

Shoshi Shimizu has just retired as a professor at Gifu University in Gifu, Japan

Duane Abata (PhD'77) has recently been elected president of the American Society for Engineering Education. He works for the National Science Foundation in Arlington, VA in the Industry/University Cooperative Research Centers Program.

John Shipinski (PhD'67) is on the board of directors of the Coordinating Research Council. He also represents Toyota in a broad spectrum of industry activities relative to providing fuels and lubricants to meet emissions regulations. A resident of Ann Arbor, MI, he is chairman of the board of the ASTM Test Monitoring Center and has been nominated for the F & L Division of the board of SAE.

Keh Tsao (Ph.D. '61) has just retired as a professor of mechanical engineering at the University of Wisconsin-Milwaukee. He spends winters in Florida and summers in Milwaukee.

Henry (Tat Ching) Yu (Ph.D. '57) is president of Sunnex, a large company in Hong Kong that specializes in making housewares, machine tools and castings.

**University of Wisconsin-Madison
Engine Research Center
1500 Engineering Drive
Madison, WI 53706**

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