



Bruce Chehroudi, PhD
Principal Scientist
Raytheon

Dr. Chehroudi, is currently a Principal Scientist and Group Leader at the Engineering Research Corporation Inc. He has been a Chief Scientist at Raytheon STX (formerly Hughes Aircraft STX) and is a former Professor of Mechanical Engineering. Dr. Chehroudi previously served as a Senior Research Staff Member at Princeton University where he engaged in experimental research in combustion engines. His R&D works at Princeton resulted in discoveries to improve engine performance, innovative fuel injection processes, and he received the Arch. T. Colwell Merit Award from the Society of Automotive Engineers (SAE) in recognition of an outstanding contribution to the SAE literature. He was actively involved in the DISC (direct injection stratified charged) Engine Program for nearly five years, a cooperative R&D project between the Department of Energy, General Motors Research Laboratory, Sandia Livermore Combustion Laboratory, and Los Alamos Scientific Laboratory. Dr. Chehroudi has established and directed an Engine Research Laboratory at the Univ. of Illinois where he conducted numerous R&D projects on formation of the pollutants and heat transfer/fluid mechanical aspects of combustion occurring in internal combustion and gas turbine engines. He is a member of Ta Beta Pi and the recipient of several awards including the SAE Arch T. Colwell Merit, the SAE Ralph R Teeter, and the SAE Recognition Awards. He has also received the SAE Forest R. McFarland Award in recognition of his efforts and leadership in contributions to the Continuing Professional Development Seminars.

Advances in Internal Combustion Engines Course

Monday, Sept. 23 - Tuesday Sept. 24, 2002, Petit II Room

From Ignition to Emission: A Journey Into A Combustion Engine

BRUCE CHEHROUDI, PhD

This two-day seminar is designed to take the attendees to a journey in which the key elements and requirements of a successful and efficient combustion cycle are introduced in an effective and concise manner. Any combustion system requires, fuel, air, and an ignition source. The journey begins with a succinct information on fuel, air, and combustion thermodynamics and continues with a description of the minimum requirements for an ignition system. Then the exploration heats up when the initiation and propagation of the flame are observed and discussed. Environmental impacts of these series of events are investigated combined with the mechanism of formation of major pollutant species. Effects of key ignition system and engine design and operating conditions are surveyed. Finally, the voyage ends with some aftertreatment measures in the exhaust system.

- Air
- Fuel
- Combustion Thermodynamics
- Ignition
- Flame propagation
- Combustion and flame propagation in engine
- Formation of major pollutant species
- Effects of some key ignition and engine design and operating parameters
- Exhaust aftertreatment choices
- Summary and conclusion

Fee Schedule: \$1295 (after August 29, \$1495)

Includes lecture sessions, course materials, breakfasts, lunches and access to the GPC 2002 Exposition

Advances in Internal Combustion Engines Course for Management of Research and Development Organizations

Wednesday Sept. 25, 2002 Petit II Room

BRUCE CHEHROUDI, PhD

Innovation is in the core of the survival of the fittest organization in today's technology-driven global economy. Innovation process begins with identification of the market needs or technology opportunity and then goes through stages such as adopting or adapting existing technology that satisfies the identified need or opportunity, inventing when needed, and finally transferring this technology by commercialization or other instrumental means. Considering the key role R&D plays in the economic health of a nation and the world as a whole, the profitability of a business enterprise, the effectiveness of a technology-based governmental agencies, and the enormous investment nations make in R&D activities, effective and efficient R&D management can have profound and determining consequences. Today, the complexity of the technology created complex organizations in which many disciplines have to be coordinated. It is the manager's primary responsibility to bring components together so they can operate smoothly and harmoniously, each making an optimal contribution to the R&D organization. Managing R&D organizations and concentrating on their productivity and excellence offers a unique set of problems and unusual challenges which is amplified when the team is scattered spatially in a global economy. The uniqueness arise primarily from two basic facts: (1) the character of the enterprise and (2) the highly-specializes, articulate, and autonomous people involved in R&D. As American economist and noble laureate Kenneth J. Arrow stated, "the central economic fact about the processes of invention and research is

that they are devoted to the production of information." Obviously, the generation of information requires research. And in addition to the R&D organizations' focus on information, research involves considerable uncertainty because the outcome can never be predicted perfectly from the different inputs used. Therefore, it will be clear in this seminar that why managing an R&D organization is largely the art of integrating the efforts of diverse, creative, intelligent and independent individuals. The ideas presented in this seminar consist of the condensed works of multitude of experts focusing on ways to improve the productivity of R&D and foster excellence and innovation in organizations.

- R&D organizations and research classification
- Components required for an R&D organizations
- Creating an effective and productive R&D Organizations
- Leadership and issues in R&D organizations
- Technology transfer issues
- Strategic planning for R&D organizations
- Case studies and discussion
- Summary and conclusions

**Fee Schedule: \$895 (after August 29, \$1195)
Includes lecture session, course materials, breakfast, lunch and access to the GPC 2002 Exposition**