



**Dr. Samim Anghaie**

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**Education**

**Ph.D.**, Pennsylvania State University, Nuclear Engineering, 1982

**Research Interests & Activities**

Primary research interests are in the Advanced Nuclear Energy Systems, Reactor Design, Thermal Hydraulics, Single- and Multi-phase Flow and Heat Transfer, and Space Nuclear Power & Propulsion. Dr. Anghaie's research findings have been published in more than 450 journals and refereed conference proceedings.

**Representative Publications (past three years):**

- Samim Anghaie, "Optimum Utilization of Nuclear Fuel with Gas and Vapor Core Reactors," will appear in Volume 46, Issues 3-4, 2005, *Progress in Nuclear Energy*.
- Roger X. Lenard and Dennis L. Youchison, Brian William, Samim Anghaie, "Conceptual Mechanical and Neutronic Design of A Tricarbide Foam Fuel Matrix for Nuclear Thermal Propulsion," *Proceedings of the Space Nuclear Conference 2005*, pp. 30-37, San Diego, California, June 5-9, 2005
- Christian F. Acosta, Bobby Ahmed, Jorge L. Weir, and Samim Anghaie, "100 kWe Space Reactor for a Potential Jupiter Icy Moon Orbiter Mission," *Proceedings of the Space Nuclear Conference 2005*, pp. 76-88, San Diego, California, June 5-9, 2005
- Anne Charmeau, Samim Anghaie, "A Hybrid Fine-Coarse Computational Mesh Simulation Tool for Space Nuclear Systems," *Proceedings of the Space Nuclear Conference 2005*, pp. 223-230, San Diego, California, June 5-9, 2005
- James Pasch, Samim Anghaie, and Michael Popp, "Two-Phase Hydrogen Properties and Modeling Approaches for Nuclear Thermal Propulsion (NTP) Applications," *Proceedings of the Space Nuclear Conference 2005*, pp. 231-240, San Diego, California, June 5-9, 2005

- Dennis L. Youchison and Roger X. Lenard, Brian William, Samim Anghaie, “Development of A Tricarbide Foam Fuel Matrix for Nuclear Propulsion,” *Proceedings of the Space Nuclear Conference 2005*, pp. 258-268, San Diego, California, June 5-9, 2005
- Reza Gouw and Samim Anghaie, ”Nuclear Design Characteristics of Ultrahigh Temperature Space Reactors with Thermal Spectrum,” *Proceedings of the Space Nuclear Conference 2005*, pp. 669-675, San Diego, California, June 5-9, 2005
- Smith, B., S. Anghaie, “[Gas Core Reactor with Magnetohydrodynamic Power System and Cascading Power Cycle](#),” *Nuclear Technology*, Volume 145, Number 3, Pages 311-318, March 2004
- Honaiser, E. and S. Anghaie, “FPTRAN: A Volatile Fission Products and Structural Materials Transport Code for SCDAP/RELAP5” *Proceedings of International Congress on Advances in Nuclear Power Plants (ICAPP '04)*, ANS Publications, pp. 1410-1419, Pittsburgh, PA, June 13-18, 2004.
- Bays, S., S. Anghaie, B. Smith, and T. Knight, “Thermal Design of an Ultrahigh Temperature Vapor Core Reactor Combined Cycle Nuclear Power Plant,” *Proceedings of International Congress on Advances in Nuclear Power Plants (ICAPP '04)*, ANS Publications, pp. 2195-2209, Pittsburgh, PA, June 13-18, 2004.
- Knight, T. and S. Anghaie, “Estimation of Specific Mass for Multimegawatt NEP Systems Based on Vapor Core Reactors with MHD Power Conversion,” *Proceedings Space Technology and Applications International Forum – STAIF 2002*, Albuquerque, NM, AIP Conference Proceedings Vol. 699, 379-386, Albuquerque, NM, February 8-11, 2004.
- Roux, V. and S. Anghaie, “CFD Calculations and Evaluation of RELAP5 Coarse-Mesh Cross Flow Model,” *Proceedings of 10<sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics*, Paper E00222 (11 pages), Seoul, Korea, October 5-11, 2003.
- Kim, S., S. Anghaie, and G. Chen, “Numerical Prediction of Multicellular Melt Flow During Natural Convection-Dominated Melting,” *Journal of Thermophysics and Heat Transfer*, Vol. 17(1), 62-68, January 2003.
- Smith, B.M., S. Anghaie, T.W. Knight, “Fully Integrated Fuel Cycle and Actinide Burning with Gas Core Reactors,” *Proceedings of International Congress on Advances in Nuclear Power Plants (ICAPP '03)*, Paper 3347, ANS Pub., Córdoba, Spain, 4–7 May, 2003
- Knight, T.W., B.M. Smith, and S. Anghaie, “Low Weight and Compact Space Power with Vapor Core Reactors,” *Proceedings of International Congress on Advances in Nuclear Power Plants (ICAPP '03)*, Paper 3348, ANS Pub., Córdoba, Spain, May 4-7, 2003
- Knight, T.W., S. Anghaie, J. Plancher, and R. Gouw, “Square Lattice Honeycomb Tri-Carbide Fueled Reactor Design for Space Power and Propulsion,” *Proceedings of*

- International Congress on Advances in Nuclear Power Plants (ICAPP '03)*, Paper 3350 (7 Pages), ANS Publications, Córdoba, Spain, May 4-7, 2003
- Kim, K.Y., S. Kim, K.J. Lee, B.J. Chung, Y.J. Lee, M.C Kim, and S. Anghaie, "Imaging of Two-Phase Flow In Rod Bundle with Dynamic Electrical Impedance Tomography," *Proceedings of International Congress on Advances in Nuclear Power Plants (ICAPP '03)*, Paper 3085, ANS Pub., Córdoba, Spain, May 4-7, 2003
  - Knight, T. W. and S. Anghaie, "Processing and Fabrication of Mixed Uranium/Refractory Metal Carbide Fuels with Liquid-Phase Sintering" *Journal of Nuclear Materials*, Vol. 306 (1), (2002) pp. 54-60, November 2002
  - M.-C. Kim, S. Kim, H.-J. Lee, Y.-J. Lee, K.-Y. Kim, and S. Anghaie, "An Experimental Study of Electrical Impedance Tomography for the Two-Phase Flow Visualization," *International Communications in Heat and Mass Transfer*, Vol. 29, No. 2, pp. 193-202, February 2002.
  - Anghaie, S. "An Overview of Two-Phase Computational Fluid Dynamics and Heat Transfer," Invited Keynote Lecture, *ANS Transactions*, Vol. 86, June 2002
  - Knight T.W., Blair Smith, and Samim Anghaie "Specific Mass Estimates for A Vapor Core Reactor With MHD," *Proc. International Congress on Advanced Nuclear Power Plants*, Hollywood, FL, June 9-13, 2002
  - Anghaie, S. "Prospect of Nuclear Power MHD Conversion", *Invited Paper, Proceedings of 6<sup>th</sup> International Symposium on Propulsion for Space Transportation of the 21<sup>st</sup> Century*, Palais des Congres, Versailles, France, May 14-17, 2002

**Major Invited Lectures & Plenary Presentations (past 3 years):**

- "Nuclear Thermal Propulsion – Fuels," *Opening Plenary, 2005 Space Nuclear Conference, ANS Embedded Topical Meeting*, June 5-9, 2005, San Diego, California.
- "An International Perspective on US Advanced Nuclear Power Systems," *Opening Plenary, 2005 International Congress on Advances in Nuclear Power Plants (ICAPP '05)*, May 15-19, 2005, Seoul, Korea.
- "Nuclear Magnetohydrodynamic Space Power with Steady and Pulse Gas Core Reactors," *NASA/JPL/MSFC/UAH 16th Annual Advanced Space Propulsion Workshop*, April 7 - 8, 2005.
- "Kiwi to Phoenix: Past, Present, and Future of Space Nuclear Power & Propulsion in USA," *Keynote Address, Opening Ceremony, International Conference on Nuclear Power in Space– 2005*, Moscow/Podolsk, Russia, March 1 - 3, 2005.
- "Steady and Pulse Gas Core Reactors for Multimegawatt Space Power Applications," *Invited Plenary Lecture, International Conference on Nuclear Power in Space– 2005*, Moscow/Podolsk, Russia, March 1 - 3, 2005.

- “*Past, Present, and Future of Space Nuclear Power & Propulsion in USA – Part II Nuclear Fuel, Invited Plenary Lecture, International Conference on Nuclear Power in Space– 2005*, Moscow/Podolsk, Russia, March 1 - 3, 2005.
- “*Optimum Utilization of Nuclear Fuel with Gas and Vapor Core Reactors*,” *Invited Lecture, First International Symposium on Innovative Nuclear Energy Systems (INES-1)*, October 31 – November 4, 2004, Tokyo, Japan.
- “*Steady and Pulse Gas Core Reactors for High Energy Space Power and Propulsion Applications*,” *Invited Presentation, Plenary Presentation, NASA JPL/MSFC 15<sup>th</sup> Annual Advanced Space Propulsion Workshop*, Pasadena, CA, June 15-17, 2004.
- “*Optimum Utilization of Nuclear Fuel with Gas and Vapor Core Reactors*,” *International Symposium on Innovative Nuclear Energy Systems for Sustainable Development of the World*, Tokyo, Japan, October 31 – November 4, 2004.
- “*Steady and Pulse Gas Core Reactors for High Energy Space Power and Propulsion Applications*,” *NASA JPL/MSFC 15<sup>th</sup> Annual Advanced Space Propulsion Workshop*, Pasadena, CA, June 15-17, 2004.
- “*Fuels for Nuclear Thermal Propulsion*,” *Invited Seminar, Advanced Propulsion Center, NASA-MSFC*, Huntsville, AL, April 30, 2004.
- “*A Pulsed Gas Core Reactor Concept for Space Power & Propulsion Applications*,” *Space Technology and Applications International Forum – STAIF 2004*, Albuquerque, NM, Albuquerque, NM, February 8-11, 2004.
- “*A Figure of Merit for Geometrical design of Space Reactor Fuels*,” *Space Technology and Applications International Forum – STAIF 2004*, Albuquerque, NM, Albuquerque, NM, February 8-11, 2004.
- “*An Overview of Prismatic Cermet Fuel Development and Test Data*,” *Space Technology and Applications International Forum – STAIF 2004*, Albuquerque, NM, Albuquerque, NM, February 8-11, 2004.
- “*NTP Fuel Options and Development Strategies: Ternary Carbide Fuel Options*,” *Nuclear Thermal Propulsion (NTP) in the 21<sup>st</sup> Century*, Ohio Aerospace Institute (OAI) / NASA Glenn Research Center, December 4-5, 2003
- “*Pulsed Magnetic Field Driven Gas Core Reactors for Space Power & Propulsion Applications*,” *Plenary Presentation, NASA Advanced Space Propulsion Workshop*, Huntsville, AL, April, 2003
- “*Recent Developments in Vapor Core Reactors with MHD Power Conversion for Space Power Systems*,” *Plenary Presentation, NASA Advanced Space Propulsion Workshop*, Huntsville, AL, April, 2003
- “*Generation IV Nuclear Energy Systems, Non-classical Reactor Concepts*,” *Invited Seminar, Massachusetts Institute of Technology Lecture Series on Advanced Nuclear Power*, MIT, Cambridge, MA, March 10, 2003

- “US Trends and Ideas for Nuclear Power Generation in Near and Distant Future,” *Invited Plenary Presentation, 18th KAIF/KNS (Korea Atomic Industrial Forum/Korea Nuclear Society) Annual Conference*, April 11, 2003, Seoul, Korea
- “Novel Concepts for Space Nuclear Power & Propulsion,” Invited Seminar, *Seoul National University, Seoul*, Korea, April 10, 2003
- “R&D Needs in Support of Advanced Reactor Licensing,” Panel Presentation, *Nuclear Safety research Conference*, US Nuclear Regulatory Commission, Washington, D.C., October 28-30, 2002
- “Molten Salt Reactor System,” Invited Presentation, Plenary Session on Generation IV Research & Development, *Americas Nuclear Energy Symposium*, Miami, FL, October 16-18, 2002
- “Pulsed and Steady Gas Core Reactor Systems,” Invited Seminar, *Sandia National Laboratories*, Albuquerque, NM, October 1, 2002
- “Safe and Sustainable Nuclear Power Generation with gas core Reactor Systems”, Plenary Presentation, Advanced Fission, *11<sup>th</sup> International Conference on Emerging Nuclear Energy systems*, Albuquerque, NM, September 29 – October 4, 2002
- “Pulsed and Steady Gas Core Reactor MHD Systems”, *Los Alamos National Laboratories*, Invited Seminar, Los Alamos, NM, September 19, 2002
- “An Overview of Two-Phase Computational Fluid Dynamics and Heat Transfer,” *Keynote Lecture, American Nuclear society Annual Meeting*, Hollywood, FL, June 9-13, 2002
- "Gen IV Non-Classical Nuclear Power Systems" Plenary Presentation, Technology Challenges for Advanced Plants, *International Congress on Advanced Nuclear Power Plants*, Hollywood, FL, June 9-13, 2002
- “Vapor Core Reactor with MHD Power Generator for Multi-Megawatt NEP Applications”, *Plenary Presentation, NASA JPL-MSFC Advanced Space Propulsion Workshop*, Pasadena CA, June 4-6, 2002
- “Prospect of Nuclear Power MHD Conversion”, *Invited Lecture, 6<sup>th</sup> International Symposium on Propulsion for Space Transportation of the 21<sup>st</sup> Century*, Palais des Congres, Versailles, France, May 14-17, 2002
- “Advanced Materials for Space Nuclear Propulsion”, *Invited Lecture, 6<sup>th</sup> International Symposium on Propulsion for Space Transportation of the 21<sup>st</sup> Century*, Palais des Congres, Versailles, France, May 14-17, 2002
- “Advanced Non-Classical Reactors,” *Opening Plenary Presentation, DOE Higher Temperature Reactor Materials Workshop*, La Jolla, California, March 18-21, 2002.
- “Square Lattice Honeycomb NTP System Optimization,” *Invited Lecture, Fission Propulsion Systems, 19<sup>th</sup> Symposium on Space Nuclear Power and Propulsion*, STAIF 2002, Albuquerque, NM, February 4, 2002.

### **Major Professional Activities (past 3 years)**

- *General Chairman, 2006 International Congress on Advances in Nuclear Power Plants*, June 4-8, 2005, Reno, NV
- *Member, Technical Program Committee and Steering Committee, 2005 Water Reactor Fuel Performance*, October 2-5, 2005
- *Member, Technical Program Committee and Steering Committee, 2004 LWR Fuel Performance*, Orlando, September 19-22, 2004
- *Publication Chair, 2004 LWR Fuel Performance Meeting*, Orlando, FL, September 19-22, 2004
- *Steering Committee, International Congress on Advances in Nuclear Power Plants*, ICAPP '05, May 15-19, 2005, Seoul., Korea.
- *Member, Steering Committee, International Congress on Advances in Nuclear Power Plants (ICAPP '04)*, Pittsburgh, PA, June 13-18, 2004
- *Publication Chairman, 2005 Space Nuclear Conference*, June 2-6, 2005, San Diego, California.
- *Chairman, Opening Plenary, First International Symposium on Innovative Nuclear Energy Systems (INES-I)*, October 31 – November 4, 2004, Tokyo, Japan.
- *Chairman, Opening Plenary, 2005 International Congress on Advances in Nuclear Power Plants (ICAPP '05)*, May 2-6, 2005, Seoul, Korea.
- *Chairman, Plenary Session, Advanced Nuclear Energy System Development, 2005 International Congress on Advances in Nuclear Power Plants (ICAPP '05)*, May 2-6, 2005, Seoul, Korea.
- *Publication Chairman, International Congress on Advances in Nuclear Power Plants, ICAPP'04*, Pittsburgh, PA, June 13-18, 2004
- *Publication Chairman, International Congress on Advances in Nuclear Power Plants, ICAPP'03*, Cordoba, Spain, May 4-7, 2003
- *Technical Program Chairman, 2002 American Nuclear Society Annual Meeting*, Hollywood, FL, June 9-13, 2002
- *Publication Chairman, International Congress on Advanced Nuclear Power Plants, ICAPP*, Hollywood, FL, June 9-13, 2002