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**Brief Summary:** Dr. Phongikaroon earned his PhD and BS degrees in chemical engineering and nuclear engineering from University of Maryland, College Park in 2001 and 1997, respectively. Prior joining the Virginia Commonwealth University (VCU) in January 2014, he held academic and research positions at University of Idaho in Idaho Falls, ID; Idaho National Laboratory in Idaho Falls, ID; and Naval Research Laboratory, Washington, D.C. During his research career, Dr. Phongikaroon has established chemical and electrochemical separation of used nuclear fuel through pyroprocessing technology and extended his expertise toward reactor physics and material detection and accountability for safeguarding applications. These developments include kinetics in ion exchange process, advanced chemical separation routines via cold fingers and zone freezing, electrochemical methods, laser induced breakdown spectroscopy, and computational modeling for electrorefiner. This effort has led to a strong establishment of Radiochemistry and Laser Spectroscopy Laboratories at VCU. Dr. Phongikaroon and his team has published their research work in over 50 papers in peer-reviewed journals and presented at over 100 international and national conferences and workshops. Dr. Phongikaroon has been able to maintain continuous diverse research support from international and national programs through Department of Energy, national laboratories, and other universities. He has been Principal Investigator and Co-Principal Investigator for more than 20 external supported projects in total of over 3.84 million dollars of external awards since joining academia in 2007. He has taught more than 20 classes for resident students and more than 5 classes for continuing (long distance/online) education since 2007. The curriculum for these classes was updated and complete lecture notes were prepared to connect fundamental nuclear, mechanical and chemical concepts to real world applications.

**RANK OR TITLE:** Qimonda Associate Professor (2019 – 2020) and Director of Nuclear Engineering Program

**DATE OF EMPLOYMENT AT VIRGINIA COMMONWEALTH UNIVERSITY:** January 1, 2014

**DATE OF PRESENT RANK OR TITLE:** March 18, 2013 (from University of Idaho); January 1, 2014 (from VCU)

**DATE OF TENURE:** May 31, 2013 (from University of Idaho); July 1, 2016 (from VCU)

**PROFESSIONAL LICENSE:** P.E., Chemical Engineering, Idaho (Certificate No. 15566) since 2013

**PERSONAL DATA:**

Date of Birth—September 17, 1974

Place of Birth—Bangkok, Thailand

Citizenship—US Citizen

**EDUCATION BEYOND HIGH SCHOOL:**

**Degrees:**

Ph.D., University of Maryland, College Park, Maryland, 2001, *Chemical Engineering*

- Dissertation: Drop Size Distribution for Liquid-Liquid Dispersions Produced by Rotor-Stator Mixers

- Thesis Advisor: Prof. Richard Calabrese

B.S., University of Maryland, College Park, Maryland, 1997, *Nuclear Engineering* with *secondary field in Chemical Engineering*

**EXPERIENCE:****Teaching, Extension and Research Appointments:**

Director of Nuclear Engineering Programs (06/2018 – Present), Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, Virginia

- Leading the team of six full-time professors and taking a responsibility for the academic and research aspects of the new VCU nuclear engineering program (including student and faculty recruitment, curriculum development, accreditation, funding, research collaborations, industrial partnerships, outreach, etc.).

Associate Professor (01/2014 – Present, TENURED on 07/2016), Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, Virginia

- Developing radiochemistry laboratory with special nuclear materials analysis and electrochemical applications for used nuclear fuel reprocessing.
- Incorporating and expanding usages of laser induced breakdown spectroscopy and laser laboratory suite with robotic design and inspection.
- Advising postdoctoral associate, graduate and undergraduate students, and high school students on course work and research direction to completion of Department of Energy (DOE) funded projects.
- Teaching and developing new courses for nuclear curriculum such as Molten Salt Reactor, Fast Reactors for graduate students.

Associate Professor - TENURED (03/2013-12/2013), Assistant Professor (08/2007-03/2013), Affiliate Professor (09/2005-08/2007), Department of Chemical Engineering and Nuclear Engineering Program, University of Idaho, Idaho Falls, Idaho

- Advised students and research scientists on course work and research direction to completion of projects, producing multiple peer-reviewed publications.
- Served as the Radiochemistry Laboratory Lead at the Center for Advanced Energy Studies (CAES) overseeing and having responsibilities on radiological safety and trainings, environmental, safety and health (ES&H) regulation and compliance including work controls for on-going projects.
- Taught core nuclear and chemical engineering courses and developing new courses for the nuclear engineering program at the university.
- Managed on projects and finances to support graduate students and research scientists/engineers under many successful written proposals, grants and contracts.
- Worked in the area of pyroprocessing technology in both theoretical and experimental studies—Electrorefiners, electrolytic oxide reduction and chemistry, and ion exchange.
- Collaborated internationally for advanced computational modeling under international nuclear initiatives supported by DOE.
- Led as the PI on innovative research projects involving in nuclear and chemical engineering applications and processes.

Research Engineer, Pyroprocessing Technology Department, Idaho National Laboratory, Idaho Falls, Idaho: 10/2004 – 08/2007

- Developed and validated simulated models for Mk-IV electrorefiner.
- Involved in conceptual design of molten salt loop, focusing on pumping technology and heat exchanger.
- Participated in Generation IV oxide fuel treatment and electrorefining and involved in the treatment process of the next generation oxide fuels under the Advanced Fuel Cycle Initiative (AFCI) program; specifically analyzing an oxide reduction cell and bubble dynamics in electrolyte.
- Worked to optimize an ion exchange model for multivalent cation species interact with zeolite-A in the molten eutectic salt to improve the ceramic waste process within the EBR-II spent fuel treatment process.

National Research Council Postdoctoral Associateship, Naval Research Laboratory, Washington, D.C.: 10/2001-10/2004

- Investigated experimentally the physical characteristics of the turbulent flow below and above a surfactant contaminated free surface caused by a Reynolds ridge in the wind-wave tunnel via Digital Particle Image Velocimetry (DPIV) and Infrared (IR) Imagery techniques.
- Studied surface thermal structure and interfacial instability of an *unsteady* state Reynolds ridge caused by pulsed gas jet on a surfactant contaminated surface.
- Developed a theoretical model for the formation, growth, and transport process of a wind-driven Reynolds ridge and investigated thermal plume turbulence from IR images of free surface flow and statistically analyzing these passive scalars to understand the effect of free convection on air/water interface with a presence of surfactant.

### TEACHING ACCOMPLISHMENTS:

#### Areas of Specialization:

Electrochemical and Chemical Separation Methods for Reprocessing of Used Nuclear Fuel; Molten Salt Reactor Physics and Technology; Nuclear Fuel Cycle; Multiphase Fluids; Transports and Interfacial Hydrodynamics; Laser Spectroscopy for Material Detection and Accountability; Economics in Nuclear Technology; Nuclear Safeguards

#### Courses Taught (\* denotes online teaching):

##### Undergraduate courses

<u>Course Number</u>	<u>Course Title (Credit hours)</u>	<u>Semester</u>	<u>Enrollment</u>	<u>Course Evaluation</u>	<u>Instructor Evaluation</u>
*EGMN 303	Thermal Systems Design (3)	S2020	97	3.67	3.79
EGMN 352 <sup>1</sup>	Nuclear Reactor Theory (3)	S2017	16	4.00	4.23
		S2015	19	3.24	3.88
EGMN 301	Fluid Mechanics (3)	S2019	31	3.74	3.73
		S2018	32	4.04	4.21
EGMN 453 <sup>2</sup>	Economics of Nuclear Power Production (3)	F2015	13	4.15	4.38
		F2014	21	3.94	4.39
EGMN 456	Nuclear Design & System (3)	F2019	9	3.57	4.14
		F2018	13	4.25	4.33
EGMN 591	Nuclear Fuel Cycle (3)	F2015	8	3.38	3.75
			Average:	3.80±0.33	4.08±0.27

##### Graduate courses

<u>Course Number</u>	<u>Course Title (Credit hours)</u>	<u>Semester</u>	<u>Enrollment</u>	<u>Course Evaluation</u>	<u>Instructor Evaluation</u>
*EGMN 575	Fast Breeder Reactor (3)	F2019	8 (in class)	3.88	3.75
			11 (online)	3.00	3.22
EGMN 591	Nuclear Safeguards, Security, and Nonproliferation (3)	S2016	11	4.10	4.80
EGMN 664	Advanced Fluid Mechanics (3)	S2019	5	4.25	4.50

<sup>1</sup> Used to be EGRN 310

<sup>2</sup> Used to be EGRN 410

EGMN 610	Topics in Nuclear Engineering (3)	S2018	5	4.33	4.67	
		F2016	13	3.78	4.00	
EGMN 690	Mechanical and Nuclear Engineering Seminar (1)	S2020	27	3.73	4.18	
		S2017	39	3.90	4.33	
		F2016	38	3.68	3.86	
		S2016	36	3.90	4.43	
		F2015	37	3.75	4.14	
		S2015	23	3.50	3.77	
		F2014	30	3.76	3.95	
*EGRN 691	Advanced Nuclear Fuel Cycle (3)	F2015	9	4.11	4.67	
EGMN 691	Fast Reactors (3)	S2017	5	4.25	4.75	
*EGMN 691	Molten Salt Reactor & Economics (3)	S2017	1	N/A	N/A	
				Average:	3.86±0.34	4.20±0.45

### Teaching courses from the previous institution

<u>Course Number</u>	<u>Course Title (Credit hrs)</u>	<u>Semester</u>	<u>Enrollment</u>
*NE 450	Principles of Nuclear Engineering (3)	F2013	7
		S2013	15
		F2012	4
		F2011	11
		S2011	7
NE 504	Applied Mathematics for Engineers (3)	S2012	3
*NE 504	Nuclear Waste Immobilization (3); Co-teach	S2011	10
		S2010	7
*NE 504	Molten Salt Technology - Fundamentals to Applications for Scientists and Engineers	S2011	6
		S2008	5
NE 504	Ion Exchange - Fundamentals to Applications	S2009	3
*NE 570	Nuclear Chemical Engineering (3)	S2013	3
		F2011	7
		F2009	10
ENVS504	Energy, Sustainability, and Modeling (3); Co-teach	F2009	8
ChE 223	Material and Energy Balances (3)	S2007	1
ChE 515	Transport Phenomena (3)	F2013	2
ChE 541	Chemical Engineering Analysis I (3)	F2012	5
		F2010	6
		F2008	6

**Courses Developed:**

- EGMN 664 – Advanced Fluid Mechanics
- EGMN 691 – Fast Reactors
- EGMN 691-C99 – Molten Salt Reactors - Economics
- EGMN591 – Nuclear Safeguards, Security and Nonproliferation
- EGRN 691 – Advanced Nuclear Fuel Cycle
- ChE/NE 504 – Special Topics: Applied Mathematics for Engineers
- ChE/NE 504 – Special Topics: Molten Salt Technology—Fundamentals and Applications for Scientists and Engineers
- ChE/NE 504 – Special Topics: Ion Exchange—Fundamentals to Applications
- ENVS 404/504 –Special Topics: Energy, Sustainability, and Modeling (co-developer)

**Mentorship:**

## Postdoctoral Associates:

- Dr. Woods, Michael (Ph.D. Mechanical and Nuclear Engineering, VCU), January 2020 – June 2020
- Dr. Yoon, Dalsung (Ph.D. Mechanical and Nuclear Engineering, VCU), January 2017 – August 2017
- Dr. Kim, Seung Hyun (Ph.D. Nuclear Engineering, Chungnam National University, Daejeon, South Korea), January 2014 – September 2016

## Graduate Students:

Advised to Completion (major professor):*Doctor of Philosophy*

- Andrew, Hunter, Ph.D., May 2020 (Mechanical and Nuclear Engineering)
  - Current employment: Will be joining Oak Ridge National Laboratory in June
  - Position: Postdoctoral Scientist
  - Dissertation: Development of Near-Real Time Material Detection and Analysis by Coupling Electrochemical & Optical Spectroscopy Methods for Molten Salt Systems
- Woods, Michael, Ph.D., December 2019 (Mechanical and Nuclear Engineering)
  - Current employment: Will be joining Idaho National Laboratory in June
  - Position: Postdoctoral Scientist
  - Dissertation: Electrochemical Separation of Multivalent Species on a Liquid Bismuth Cathode in LiCl-KCl Eutectic for Used Nuclear Fuel Reprocessing
- Motny, Riyadh, Ph.D., May 2019 (Mechanical and Nuclear Engineering)
  - Current employment: Higher Education of Iraq
  - Position: Mechanical and Nuclear Engineer
  - Dissertation: Compositional Analysis of Cerium and Cesium in Rapid Setting Cement as an Immobilization Agent for Nuclear Waste
- Pouri, Samaneh, Ph.D., August 2017 (Mechanical and Nuclear Engineering)
  - Current employment: VCU
  - Position: Postdoctoral Research Engineer
  - Dissertation: Comparative Studies of Diffusion Models and Artificial Neural Intelligence on Electrochemical Process of U and Zr Dissolutions in LiCl-KCl Eutectic Salts
- Williams, Ammon, Ph.D., December 2016 (Mechanical and Nuclear Engineering)
  - Current employment: Idaho National Laboratory
  - Position: Research Engineer I in Nuclear Safeguards
  - Dissertation: Measurement of Rare Earth and Uranium Elements Using Laser-Induced Breakdown Spectroscopy (LIBS) in an Aerosol System for Nuclear Safeguards Applications

- Yoon, Dalsung, Ph.D., December 2016 (Mechanical and Nuclear Engineering)
  - Current employment: Korea Atomic Energy Research Institute
  - Position: Research Engineers I in Nuclear Waste Separation Division
  - Dissertation: Electrochemical Studies of Cerium and Uranium in LiCl-KCl Eutectic for Fundamentals of Pyroprocessing Technology

At previous institution:

- Marsden, Ken, Ph.D., December 2015 (Materials Science Engineering)
  - Current employment: Idaho National Laboratory
  - Position: Manager of the Pyrochemistry and Molten Salt Systems
  - Dissertation: Measurement and Analysis of Uranium and Cerium Depositions from LiCl-KCl Eutectic
- Hoover, Robert O., Ph.D., May 2014 (Chemical Engineering)
  - Current employment: Idaho National Laboratory
  - Position: Research Engineer II
  - Dissertation: Uranium and Zirconium Electrochemical Studies in LiCl-KCl Eutectic for Fundamental Applications in Used Nuclear Fuel Reprocessing

Studies in Progress (major professor):

*Doctor of Philosophy*

- Killingers, Dimitris (Mechanical and Nuclear Engineering) – May 2021
- Jones, Reginald (Mechanical and Nuclear Engineering) – May 2022
- Wards, Dylan (Mechanical and Nuclear Engineering) – May 2023

Advised to Completion (major professor):

*Master of Science*

- Eason, George, M.S., Dec 2020 (Mechanical and Nuclear Engineering)
  - Current employment: Education Tech of Tennessee
  - Position: Engineer
  - Non-thesis
- Woods, Michael, M.S., May 2018 (Mechanical and Nuclear Engineering)
  - Current employment: VCU
  - Position: Ph.D. student
  - Non-thesis
- Bryce, Keith, M.S., December 2015 (Chemical Engineering)
  - Current employment: RPI
  - Position: Graduate Student
  - Non-thesis

At previous institution:

- Versey, Joshua, M.S., August 2013 (Nuclear Engineering)
  - Current employment: Naval Reactors Facility, Idaho
  - Position: Intermediate Waste and Shipping Engineer
  - Master thesis: Fission Product Separation from Pyrochemical Electrolyte by Cold Finger Melt Crystallization
- Pack, Michael, M.E., May 2013 (Nuclear Engineering)
  - Current employment: Naval Reactors Facility, Idaho
  - Position: Radiation Detection Equipment Engineer
  - Non-thesis
- Hanson, Cynthia, M.S., May 2013 (Nuclear Engineering)
  - Current employment: Utah State University, Utah
  - Position: Ph.D. student, Biomedical Engineering

- Master thesis: Laser-Induced Breakdown Spectroscopy (LIBS): Temperature Effects on Spectra of Molten Salt Systems
- Hough, Shane, M.S., December 2012 (Nuclear Engineering)
  - Current employment: Naval Reactors Facility, Idaho
  - Position: Lead Engineer, Return From INTEC Liaison Office
  - Master thesis: The Production of <sup>99</sup>Mo in a 1000 MWe Commercial Power Boiling Water Reactor
- Williams, Ammon, M.S., July 2012 (Chemical Engineering)
  - Current employment: University of Idaho, Idaho
  - Position: Ph.D. student, Nuclear Engineering
  - Master thesis: Zone Freezing Study for Pyrochemical Process Waste Minimization
- Bezzant, Ryan, M.E., December 2011 (Nuclear Engineering)
  - Current employment: U.S. Navy
  - Position: Instructor of the Naval Nuclear Power School
  - Master thesis: Effect of Oxygen Bubble Distributions on Rare Earth Precipitates in Molten Salt
- Shaltry, Michael, M.S., May 2011 (Nuclear Engineering)
  - Current employment: Idaho National Laboratory
  - Position: Research Engineer I
  - Master thesis: Ion Exchange Kinetics of Fission Products Between Molten Salt and Zeolite-A
- Hoover, Robert O., M.S., May 2010 (Nuclear Engineering)
  - Current employment: University of Idaho, Idaho
  - Position: Ph.D. candidate, Chemical Engineering
  - Master thesis: Development of a Computational Model for the Mark-IV Electrorefiner

Visiting Graduate Students (co-advisor):

- Perry, Jonathan, Ph.D. (Physics, Texas A&M) – FY 2013
- Park, Jaeyeong, Ph.D. (Nuclear Engineering, Seoul National University) – FY 2013
- Martin, Sean, M.S. (Nuclear Engineering, University of Wisconsin-Madison) – FY 2012
- Sooby, Elizabeth, Ph.D. (Physics, Texas A&M) – FY 2011
- Allensworth, James, M.S. (Nuclear Engineering, North Carolina State University) – FY 2011

Termination:

- Taha, Khalid (Mechanical and Nuclear Engineering) – (Terminated in July 2017) Reason: Fail PhD qualifier

Served/Serving on graduate committee:

- McPherson, Shane, Ph.D. proposal, Chemistry, May 2020
- Amarasinghe, Kasun, Ph.D., Computer Science, December 2019
- Lloyd, Cody, Ph.D. proposal, Mechanical and Nuclear Engineering, October 2019
- Gonzalez, Miguel Toro, Ph.D., Mechanical and Nuclear Engineering, December 2018
- Wijayasekara, Dumidu, Ph.D., Computer Science, May 2016
- Swanson, John, M.S., Mechanical and Nuclear Engineering, April 2015

At previous institution:

- Belt, Jeffry, Ph.D., Chemical Engineering, March 2014
- Hiruta, Mie, M.S., Nuclear Engineering, September 2013
- Ghasemisahebi, Esmail, M.S., Nuclear Engineering, July 2013
- Glazoff, Michael, M.S., Nuclear Engineering, May 2013
- Griffard, Cory, M.S., Mechanical Engineering, May 2012

- Gutknecht, Toni, M.S., Nuclear Engineering, May 2012
- Johnson, Gannon, M.S., Mechanical Engineering, February 2012
- Albiston, Mark, M.S., Nuclear Engineering, November 2011
- Zhu, Pengyu, M.S., Chemical Engineering, May 2009
- McBurney-Rebol, Jesse, M.S., Nuclear Engineering, November 2008

Undergraduate Interns:

- Smith, John (Mechanical and Nuclear Engineering from VCU – May 2020 – present)
- Wards, Dylan (Chemistry from VCU – January 2020 – May 2020)
- Bryars, Davis (Mechanical and Nuclear Engineering from VCU – August 2019 – March 2020)
- Dobronova, Miroslava (Slovak University of Technology in Bratislava – May 2019 – November 2019)
- Earheart, Meredith (Mechanical and Nuclear Engineering from VCU – April 2018 – April 2019)
- Cano, Ivan (Mechanical and Nuclear Engineering from VCU – January 2018 – December 2018)
- Baggett, Adam (Mechanical and Nuclear Engineering from VCU – May 2017 – May 2019)
- Jones, Reginald (Mechanical and Nuclear Engineering from VCU – April 2017 – July 2018)
- Brown, Dakota (Mechanical and Nuclear Engineering from VCU – February 2017 – August 2017)
- Rodrigue, Brian (Mechanical and Nuclear Engineering from VCU – January 2017 – May 2017)
- Scott, Jason (Mechanical and Nuclear Engineering from VCU – January 2017 – May 2017)
- Temjiraseranee, Chaiwat (Chemical Engineering from Kasetsart University, Thailand—June 2016 – August 2016)
- Andrews, Hunter (Mechanical and Nuclear Engineering from VCU—December 2015 to August 2016)
- Beaver, Ryan (Mechanical and Nuclear Engineering from VCU—May 2016 – July 2016)
- Bauserman, David (Mechanical and Nuclear Engineering from VCU—September 2015 to May 2016)
- Butamante Perez, Miguel (Mechanical and Nuclear Engineering from VCU—August 2015 to June 2016)
- Pormatikul, Jinnapat (Chemical Engineering from King Mongkut’s University of Technology, Thailand—July 2015 to October 2015)
- Ramonet, Juan (Mechanical and Nuclear Engineering from VCU—May 2015 to Present)
- Jenning, Stuart (Mechanical and Nuclear Engineering from VCU—May 2014 to Present)
- Killinger, Dimitris (Mechanical and Nuclear Engineering from VCU—May 2015 to July 2015)
- Rivero, Nicholas (Mechanical and Nuclear Engineering from VCU—May 2014 to May 2015)
- Allen, Christopher (Electrical Engineering from George Mason University—June 2014 to August 2014)

At previous institution:

- Ryu, Yeonglim (Chemical Engineering from Chungnam National University—August 2013 – December 2013)
- Brown, Emory (Chemical and Nuclear Engineering from University of New Mexico—May 2013 – August 2013)
- Kim, JiHyun (Chemistry from Hanyang University –September 2011 – May 2012)
- Cumberland, Riley (Nuclear Engineering from North Carolina State University—Summer 2010)



Senior Design Projects:

- Portable LIBS for Near Real Time Detection (2018-2019: De'Jah Lee, Ivan Canos, Jay Khapur, Heather Hepperle)
- Physical Properties of Molten Salt (2017-2018: Reginald Jones, Garrett Patterson)
- Transparent Furnace for Used Nuclear Fuel Reprocessing (2015-2016: Kelli McKenna, Abbie DeWitte, Hoor AlMazmi, Svetlana Ruseva)
- Molten Metal Loop via Electromagnetic (2015-2016: Joseph Keegan, Miguel Bustamante Perez, Eric Mallon)
- Molten Metal Loop via Electromagnetic (2014-2015: Scott Torres, Dominic Espiritu, Dor Granek, and Jerald Moore)
- Potassium Drawdown Reaction Separation (2012-2013: Kristofer Dole, Jeffrey Fergen, Darren Greer, and Mirna Hurtado)

High School Student:

- Willard, Charlie (DERI's Program, June 2018 – May 2019)
- Arcibal, John Mitchel (Advance College Academy, June 2016 – August 2016)
- Nash, Jonathan (Trinity Episcopal High School, February 2016 – March 2016)
- Walker, Sean (Madison High School, June 2015 – August 2015)
- Gillis, Patrick (James River High School, January 2015 – May 2015)

**Mentorship Accomplishment:**

- Robert Hoover
  - 1<sup>st</sup>Place in the *Chemical Separations Category* on his published paper in 2011, Hoover RO, Phongikaroon S, Simpson MF, Yoo T-S, Li SX. 2011. Computational model of the Mark-IV electrorefiner—2D potential and current distributions. *Nuclear Technology*, 173:176-182, for the 2012 Innovations in Fuel Cycle Research Award—An awards program of the U.S. Department of Energy, Office of Nuclear Energy, Fuel Cycle Research and Development (<http://www.fuelcycleinnovations.org/about.html>).
  - 2012 American Nuclear Society (ANS) Student Conference Poster Competition – 3<sup>rd</sup> Place
  - 2010 University of Idaho, Outstanding Engineering Graduate Student
  - 2009 American Institute of Chemical Engineers (AIChE) - Nuclear Engineering Division, Outstanding Student Paper Winner
- Ammon Williams
  - 2015 – 2016 NRC Graduate Fellowship
  - 2014 Innovations in Fuel Cycle Research Award winner
  - 2012 ANS Student Conference Poster Competition – 1<sup>st</sup> Place
  - 2012 University of Idaho, Outstanding Engineering Graduate Student
  - 2010 AIChE-Nuclear Engineering Division, Outstanding Student Presentation Winner.
- Michael Shaltry
  - 2012 Idaho Academy of Science, Outstanding Graduate Student Presentation Award
  - 2010 University of Idaho, Outstanding Engineering Achievement Award
  - 2010 AIChE-Nuclear Engineering Division, Outstanding Student Paper Competition Winner
- Samaneh Pouri
  - 2016 Top 5 best papers in the North America at the 24<sup>th</sup> International Conference on Nuclear Engineering (ICONE) sponsored by ASME

- Dalsung Yoon
  - 2016 ASME best award paper at the 24<sup>th</sup> ICONE
- Hunter Andrews
  - 2019 Fuel Cycle and Waste Management John D. Randall Scholarship – ANS FCWM Division
  - Best Poster Presentation at the 2018 ANS-Winter Conference, Nuclear Fuel Cycle and Management Division in Orlando, FL
  - Winner of the 2018 Innovation in Nuclear Technology – An awards program of the U.S. Department of Energy, Office of Nuclear Energy.
  - 2018 ANS-Student Conference Overall Best Graduate Paper in Gainesville, FL
  - 2018 ANS-Student Conference Podium Presentation Award in Fuel Cycle and Waste Management Division in Gainesville, FL
  - 2017 ANS-Student Conference Podium Presentation Award in Fuel Cycle and Waste Management Division in Pittsburgh, PA
  - 2016 Innovations in Fuel Cycle Research Award winner – Undergraduate Division
  - 2016 Department of Energy-Nuclear Energy University Program (DOE-NEUP) Graduate Fellowship
- Michael Woods
  - Roy G. Post Scholarship from the Waste management Symposia 2019
  - 2018-2019 Nuclear Regulatory Commission (NRC) Graduate Fellowship
  - 6<sup>th</sup> Nuclear Facilities Experience japan 2018, sponsored by TAMU, ANL and NNSA
- Dimitris Killinger
  - 2020 Roy G. Post Foundation Scholarship, Graduate Level Recipient
  - 3<sup>rd</sup> Place in Overall Graduate Student Poster Event at the ANS Winter Meeting, Washington D.C., November 2019
  - Best Student Poster Award at the 27<sup>th</sup> international Conference on Nuclear Engineering, Ibaraki, Japan on May 2019
  - 2018 Best Poster Presentation at the 2018 ANS-Winter Conference, Materials Science and Technology Division in Orlando, FL
  - 2018 ANS-Student Conference Podium Presentation Award in Materials Science and Technology Division in Gainesville, FL

**Personal Honors and Awards:**

- VCU's Qimonda Endowment Professorship, 2019 - 2020
- SAS/NASLIBS award for the best paper published in *Applied Spectroscopy* in 2018 on the topic of Laser Induced Breakdown Spectroscopy.
- Center for Advanced Energy Studies Outstanding Contributor, 2011
- Distinguished Teaching Assistant Award, the Center for Teaching Excellence, UMCP, 1998-1999
- UMCP AIChE Teaching Assistant Award, Department of Chemical Engineering, 1997-1998
- The American Nuclear Society Washington Chapter Senior Award—Senior in Nuclear Engineering with highest GPA, 1996-1997

**SCHOLARSHIP ACCOMPLISHMENTS:****Book Chapters, Publications, Exhibitions, Performances, Recitals**

**Web of Science:** Average citation per item = 7.25 and h-index = 12; sum of times cited: 428 (348 without self-citations))

**Google Scholar:**

	<u>All</u>	<u>Since 2015</u>
Citations	752	502
h-index	17	13

Highlight activities since joining VCU in 2014: 1 book chapter, 24 published articles, 32 proceeding papers and reports, and 73 posters/presentations at international and domestic conferences/workshops.

**Book Chapters:**

Yoon D, and Phongikaroon S., “Chapter 3: Electrochemical Studies of Uranium in LiCl-KCl Eutectic Salt for an Application of Pyroprocessing Technology,” in *Used Nuclear Fuel and Waste Management*, ed. Jinsuo Zhang, WSPC, 2018.

**Publications – Refereed/Adjudicated:** (the \* indicates graduate students as co-authors; the # indicates undergraduate students as co-authors); TC = Times cited; IF = Impact factor

1. \*Motny RM, \*Woods ME, Phongikaroon S. 2020. Assessment of Leaching Characteristics for Cerium and Cesium as Surrogates for Radioactive Materials. *Nuclear Technology*, DOI: 10.1080/00295450.2020.1730672 (TC = 0; IF = 0.886)
2. \*Shaltry MR, Allahar KN, Butt DP, Simpson MF, Phongikaroon S. 2020. Electrochemical Impedance Spectroscopy and Cyclic Voltammetry Methods for Monitoring SmCl<sub>3</sub> Concentration in Molten Eutectic LiCl-KCl. *Journal of Nuclear Fuel Cycle and Waste Technology*, 18(1), 1-18 (TC = 0; IF = N/A)
3. \*Andrews H, Phongikaroon S. 2019. Improvement of an Experimental Routine for Electrochemical Composition Measurements of SmCl<sub>3</sub> in LiCl-KCl Eutectic Salt Systems. *Nuclear Technology*, 206(4), 651-661 (TC = 0; IF = 0.886)
4. \*Yoon D, #Pormatikul J, Shaltry M, Phongikaroon S, Allahar K. Determination of Kinetic Properties of Sm(III)/Sm(II) Reaction in LiCl-KCl Molten Salt Using Cyclic Voltammetry and Electrochemical Impedance Spectroscopy. *Journal of Radioanalytical and Nuclear Chemistry*, 322(2), 1031-1037 (TC = 0; IF = 1.106)
5. \*Andrews H, Phongikaroon S. 2019. Development of an Experimental Routine for Electrochemical and Laser-Induced Breakdown Spectroscopy Composition Measurements of SmCl<sub>3</sub> in LiCl-KCl Eutectic Salt Systems. *Nuclear Technology*, 205(7), 891-904 (TC = 2; IF = 0.886)
6. \*Yoon D, #Baggett A, Phongikaroon S, King JA, Marsden K. 2019. Fundamental Data Acquisition toward Silver-Silver Chloride Reference Electrode. *Journal of The Electrochemical Society*, 166(6), B159-B164. (TC = 4; IF = 3.405).
7. \*Motny RM, Phongikaroon S. 2019. Effect of Cerium Concentration and Solvent on Physical and Chemical Characterization of Rapid Setting Cement. *Nuclear Technology*, 205(5), 671-683 (TC = 1; IF = 0.886).
8. \*Williams AN, Phongikaroon S. 2018. Laser-Induced Breakdown Spectroscopy (LIBS) Measurement of Uranium in Molten Salt. *Applied Spectroscopy*, 72(7), 1029-1039. (TC = 1; IF = 2.064).
9. \*Andrews H, Phongikaroon S. 2018. Comparison of Exchange Current Density Acquisition Methods for LaCl<sub>3</sub> in Molten LiCl-KCl Eutectic Salt. *Journal of The Electrochemical Society*, 165(9), E412-E419. (TC =4; IF = 3.405)

10. \*Pouri SR, Manic M, Phongikaroon S. 2018. A Novel Framework for Intelligent Signal Detection via Artificial Neural Networks for Cyclic Voltammetry in Pyroprocessing Technology. *Annals of Nuclear Energy*, 111, 242-254. (TC = 1; IF = 1.567).
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**Manuscripts in Preparation:** (the \* indicates graduate students as co-authors; # indicates undergraduate students as co-authors)

- \*Andrews H, Phongikaroon S., “Electrochemical and Laser-Induced Breakdown Spectroscopy Signal Fusion for Detection of  $UCl_3$ - $GdCl_3$ - $MgCl_2$  in  $LiCl$ - $KCl$  Molten Salt,” submitted to the *Nuclear Technology*, April 2020.
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- \*Woods M, Phongikaroon S, “Electrochemical Properties of  $CeCl_3$  on a Liquid Bismuth Cathode in  $LiCl$ - $KCl$  Eutectic Salt,” in preparation for *Journal of Rare Earths*.

**Technical Reports Available in Literature:**

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2. Simpson MF, Phongikaroon S, Zhang J. 2018. Development and Optimization of Voltammetric Methods for Real Time Analysis of Electrorefiner Salt with High Concentrations of Actinides and Fission Products. *NEUP Final Report*, 14-6542, March 30, 2018.
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**Publications in Peer Reviewed/Evaluated for Conference Proceeding/Transaction:** (the \* indicates graduate students as co-authors; # indicates undergraduate students as co-authors)

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11. \*Woods M, Phongikaroon S. 2017. Electrochemical Study of  $\text{BaCl}_2$  and  $\text{CsCl}$  on a Liquid Bismuth Cathode in  $\text{LiCl-KCl}$  Eutectic Salt. *Transactions of American Nuclear Society*, Vol. 116(1), 158-161.
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18. \*Marsden KC, Phongikaroon S. 2016. An Initial Study of Uranium Morphology in Fused  $\text{LiCl-KCl}$ . *Transactions of American Nuclear Society*, Vol. 114(1), 189-190.
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**Professional Meeting Presentations, Posters, Workshops, Showings, Recitals:** (the \* indicates graduate student; the # indicates undergraduate student; \_\_\_ indicates presenter)

**Presentations Given at Conferences, Invited Seminars and Lectures**

1. “Nuclear Workforce for Chemical Engineers,” Lecture, Phongikaroon S. 2019 AIChE annual Meeting – Student Workshop, November 2019.
2. “Measurement and Analysis of Equilibrium Potentials of Ag/AgCl Reference with Respect to Cl<sub>2</sub>/Cl<sup>-</sup> in LiCl-KCl Eutectic Salt,” Presentation, Yoon D, Phongikaroon S. 2019 American Chemical Society Fall 2019 National Meeting, San Diego, California, August 2019.
3. “Research and Development of Molten Salts for Used Nuclear Fuel Reprocessing Technology at VCU and within the United States,” Invited Presentation, Phongikaroon S. Central Research Institute of Electric Power Industry (CRIEPI) Meeting, Japan, May 2019.
4. “Academic Research Paths on Pyroprocessing Technology in the United States with Respect to Other Nations,” Invited Presentation, Phongikaroon S. 2018 International Pyroprocessing Research Conference, Tokai, Ibaraki, Japan, October 2018.
5. “Bridging Bright Future in Nuclear Science, Engineering and Technology with Chemical Engineers,” Lecture, Phongikaroon S. 2018 AIChE annual Meeting – Student Workshop, October 2018.
6. “Progress in Pyroprocessing Technology for Used Nuclear Fuel Reprocessing toward Material Detection and Accountability for Safeguards,” Invited Seminar, Phongikaroon S. Departmental Seminar, Nuclear Engineering, University of Tennessee-Knoxville, March 2017.
7. “Academic Research and Development on Pyroprocessing Technology in the United States with Respect to Other Nations,” Invited Presentation, Phongikaroon S. 2016 International Pyroprocessing Research Conference, Jeju city, South Korea, September 2016.
8. “Progress in Pyroprocessing Technology for Used Nuclear Fuel Reprocessing toward Material Detection and Accountability for Safeguards,” Invited Seminar, Phongikaroon S, Nuclear Engineering Seminar Series, The Ohio State University, March 2016.
9. “Development of Statistical Data Base of LIBS Spectra for Lanthanides and Actinides in LiCl-KCl Eutectic Salt,” Invited Presentation, Phongikaroon S. US-ROK Pyroprocessing Safeguards Workshop, Indian Wells, California, USA, July 2015.

10. "An Interactive Reverse-Engineering Cyclic Voltammetry for Electrochemical Systems," Presentation, \*Pouri SR, Phongikaroon S. Institute of Nuclear Material Management, 56<sup>th</sup> annual meeting, Indian Wells, California, USA, July 2015.
11. "Uranium Electrochemical Detection and Analysis in Lithium Chloride-Potassium Chloride Eutectic as an Assessment for Material Accountability in Pyroprocessing Technology," Invited Presentation, Phongikaroon S., \*Hoover RO. 2015 MARC X Conference, Kona, Hawaii, USA, April 2015.
12. "Feasibility Study of Pyrochemical Treatment on Fuel Debris by performing Uranium and Zirconium Electrochemistry in LiCl-KCl Molten Salt," Invited Presentation, Phongikaroon S. International Experts' Meeting on Strengthening Research and Development Effectiveness in the Light of the Accident at the Fukushima Daiichi Nuclear Power Plant-IAEA Program, Vienna, Austria, February 2015.
13. "Analysis of Electrochemical Impedance Spectra Using Constant Phase Element for SmCl<sub>3</sub> in LiCl-KCl Eutectic," Poster, \*Yoon D, #Pormatikul J, Phongikaroon S., Shaltry M. 2015 ANS Winter Conference, Washington, DC, USA, November 2015.
14. "Progress in Pyroprocessing Technology for Used Nuclear Fuel Reprocessing toward Material Detection and Accountability for Safeguards," Invited Seminar, Phongikaroon S. Departmental of Chemical Engineering Seminar Series, University of California, Irvine, October 2015.
15. "Challenges in Long Distance Education for Multi-Institutions Focusing on Principles of Nuclear Engineering," Presentation, Phongikaroon S. ICONE 22, Prague, Czech Republic, July 2014.
16. "Feasibility Study on Direct Waste Salt Disposition through Measurement and Analysis of Salt Bead Dissolutions in Aqueous Solvents," Presentation, \*Shaltry MR, Phongikaroon S. ICONE22, Prague Czech Republic, July 2014.
17. "LIBS Measurement of Cerium Chloride in a Molten LiCl-KCl Salt—Initial Task Study in Aqueous CeCl<sub>3</sub>-LiCl-KCl," Invited Presentation, \*Williams AN, \*Yoon D, Phongikaroon S. 2014 MPACT Working Group Meeting, San Diego, CA, March 2014.
18. "Academic Research Paths and Statistics on Electrochemical Processes of Used Fuel Reprocessing in Different Nations," Invited Presentation, Phongikaroon S. 2014 International Pyroprocessing Research Conference (IPRC), Idaho Falls, Idaho, USA, October 2014.
19. "Pyrochemical Technology—A Novel Reprocessing Method in Nuclear Fuel Cycle R&D," Invited Seminar, Phongikaroon S. Nuclear Engineering Program, University of Utah, Salt Lake City, UT, April 2013.
20. "Progress in Pyroprocessing Research from Idaho National Laboratory to the Center for Advanced Energy Studies," Invited Presentation, Phongikaroon S. 2012 International Workshop on Nuclear Pyroprocessing, Daejeon, Korea, December 2012.
21. "Experimental studies and analysis of oxygen bubble formation in molten LiCl-KCl in a transparent furnace," Presentation, Phongikaroon S., \*Bezzant RW, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
22. "Pyrochemical studies at the Center for Advanced Energy Studies," Phongikaroon S. 2011 University of Florida—Departmental Seminar, Gainesville, Florida, October 2011.
23. "Progress in pyrochemical projects at the Center for Advanced Energy Studies," Presentation, Phongikaroon S. 2011. I-NERI Progress Meeting, Seoul, Korea, September 2011.
24. "Detection of trace elements in molten salts using laser induced breakdown spectroscopy (LIBS)," Invited Seminar, Phongikaroon S. 2011 Korea Advanced Institutes of Science and Technology—Seminar, Daejeon, Korea, September 2011.
25. "Simulation of the current, potential, and concentration distributions along the electrodes of Mk-IV electrorefiner," Presentation, \*Hoover RO, Phongikaroon S., Simpson MF, Yoo T-S. 2010 International Pyroprocessing Research Conference, Dimitrovgrad, Russia, December 2010.
26. "Development of chemical engineering applications in pyroprocessing technology," Invited Seminar, Phongikaroon S. University of Wisconsin, Madison, Wisconsin, July 2010.

27. "Effect of exchange current density in the Mark-IV electrorefiner," Presentation, \*Hoover RO, Phongikaroon S, Simpson MF, Yoo T-S, Li SX. ANS Winter Meeting, Washington, D.C., November 2009.
28. "Nuclear engineering & technology: a modern path for our future chemical engineers," Presentation, Phongikaroon S. AIChE Annual Meeting Workshop, Nashville, Tennessee, November 2009.
29. "Chemical engineering in nuclear science and technology," Invited Presentation, Phongikaroon S. AIChE Annual Meeting Workshop, Philadelphia, Pennsylvania, November 2008.
30. "Development of computational models for pyrochemical electrorefiners of nuclear waste transmutation systems," Presentation, Phongikaroon S, Simpson MF, Kim K-R. I-NERI Annual Review 2008, Reno, Nevada, November 2008.
31. "Development of computational models for the Mark-IV electrorefiner—effect of uranium, plutonium, and zirconium dissolution at fuel basket/salt interface," Presentation, \*Hoover RO, Phongikaroon S, Li SX, Simpson MF, Yoo T-S. 2009 International Pyroprocessing Research Conference, Jeju Island, Korea, August 2008.
32. "Development of new studies in pyroprocessing technology," Invited Presentation, Phongikaroon S. ACE Workshop, Idaho Falls, Idaho, May 2008.
33. "Development of new chemical engineering applications in pyroprocessing technology," Invited Seminar, Phongikaroon S. University of Maryland, College Park, Maryland, April 2008.
34. "Elucidation of bubble size distribution in a mock-up experiment for an oxide reduction electrochemical cell," Presentation, Phongikaroon S. AIChE Annual Meeting, Salt Lake City, UT, November 4-9, 2007.
35. "Identification of statistical invariance for anodic signals of Mk-IV electrorefiner," Presentation, Phongikaroon S, Yoo T-S. GLOBAL 2007, Boise, ID, September 9-13, 2007.
36. "Study of jet splashing at liquid/gas interface in an oxide reduction electrochemical cell," Presentation, Phongikaroon S, Herrmann SD, Li SX, Simpson MF. AIChE Annual Meeting, San Francisco, CA, November 15, 2006.
37. "Determination of bubble size distribution in an oxide reduction electrochemical cell—phase I: effect on reference electrode," Presentation, Phongikaroon S, Herrmann SD, Li SX, Simpson MF. AIChE Annual Meeting, Cincinnati, OH, November 3, 2005.
38. "Two-site equilibrium model for ion exchange between multivalent cations and zeolite-A in a molten salt," Presentation, Phongikaroon S, Simpson MF. AIChE Annual Meeting, Cincinnati, OH, November 3, 2005.
39. "High resolution temperature and velocity measurements in a wind-wave tunnel," Presentation, Phongikaroon S, Judd KP, Smith GB, Handler RA. Division of Fluid Dynamics, Seattle, WA, November, 2004.
40. "Surfactant effects on mass transfer at free surfaces in a fully developed turbulent flow," Presentation, Phongikaroon S, Judd KP, Smith GB, Handler RA. AIChE Annual Meeting, San Francisco, CA, November, 2003.
41. "The dynamics of a wind-driven Reynolds ridge," Poster, Phongikaroon S, Judd KP, Smith GB, Handler RA. 55<sup>th</sup> Annual APS Meeting Division of Fluid Dynamics, Dallas, TX, November, 2002.
42. "Effect of internal and external resistances on evaporation of a volatile chemical from a multi-component liquid spill," Presentation, Phongikaroon S, Calabrese RV. AIChE Annual Meeting, Indianapolis, IN, November, 2002.
43. "The dynamics of a wind-driven Reynolds ridge on a surfactant contaminated free surface," Presentation, Phongikaroon S, Judd KP, Smith GB, Handler, RA. AIChE Annual Meeting, Indianapolis, IN, November, 2002.
44. "Effect of internal and external resistances on droplet swelling controlled by diffusion," Presentation, Phongikaroon S, Calabrese RV. AIChE Annual Meeting, Reno, NV, November 2001.
45. "Drop size distribution and power draw in a batch rotor-stator mixers," Presentation, Phongikaroon S, Padron GA, Calabrese RV. AIChE Annual Meeting, Reno, NV, November 2001.

46. "Effect of dispersed phase viscosity and interfacial tension on drop size distribution in a batch rotor-stator mixer," Presentation, Phongikaroon S, Calabrese RV. 18<sup>th</sup> Biennial Conference on Mixing, Pocono Manor, PA, June 2001.

*Student Posters and Presentations Given at Conferences (VCU Students Only)*

1. "Effect of Using Mullite Membrane on Performance of a Silver/Silver-Chloride Reference Electrode in Eutectic LiCl-KCl Salt," Poster, \*Jones R, Phongikaroon S. 2019 ANS Winter Meeting, Washington D.C., November 2019.
2. "Understanding Thermodynamic Phase Diagrams of Molten Salt Systems via Decision Tree Regression," Presentation, #Dobronova M, \*Killinger D, Phongikaroon S. 2019 ANS Winter Meeting, Washington D.C., November 2019.
3. "Morphology of Uranium Dendrites Electrochemically Separated in Molten Salt with the Presence of Cerium," Poster, \*Killinger D, Phongikaroon S. 2019 ANS Winter Meeting, Washington D.C., November 2019.
4. "Stability Study of Platinum and Silver as Quasi-Reference Electrodes for Molten Salt Systems," Presentation, \*Killinger D, Phongikaroon S. GLOBAL 2019 International Nuclear Fuel Cycle Conference, Seattle, WA, September 2019.
5. "Application of Electrochemical and Laser Spectroscopic Methods for Composition Measurements of  $UCl_3$ - $MgCl_2$ - $GdCl_3$  in LiCl-KCl Molten Salt," Presentation, \*Andrews H, Phongikaroon S. American Chemical Society Fall 2019 National Meeting, San Diego, California, August 2019.
6. "Thermophysical Properties of  $MgCl_2$ - $CaCl_2$ -KCl Eutectic Salt," \*Wood M, Phongikaroon S. American Chemical Society Fall 2019 National Meeting, San Diego, California, August 2019.
7. "Application of Electrochemical and Laser Spectroscopic Methods for Composition Measurements of  $SmCl_3$ - $GdCl_3$  in LiCl-KCl Molten Salt," Presentation, \*Andrews H, Phongikaroon S. Southwest Institute of Nuclear Materials Management Meeting, Santa Fe, New Mexico, May 2019.
8. "Analysis and Characterization of Uranium from Electrochemical Separation in LiCl-KCl Eutectic Salt," Presentation, \*Killinger D, Phongikaroon S. 27<sup>th</sup> International Conference on Nuclear Engineering (ICONE27), Tsukuba, Ibaraki, Japan, May 2019.
9. "Combining Reactor Experiments with Study Abroad: An Underutilized Opportunity for Universities without Research Reactors," Presentation, \*Killinger D, Lloyd C, Tincher D, Morgan S, Goddard B, Phongikaroon S. 2019 Student ANS Conference, Richmond VA, April 2019.
10. "Investigation of Uranium Morphology from Electrochemical Separation in Molten Salt," Poster, \*Killinger D, #Baggett A, Phongikaroon S. 2018 American Nuclear Society-Winter Meeting, Orlando, Florida, November 2018.
11. "Investigation of Electrode Withdrawal and Laser-Induced Breakdown Spectroscopy Methods for Concentration Estimation of  $SmCl_3$  in LiCl-KCl," Poster, \*Andrews H, Phongikaroon S. 2018 American Nuclear Society-Winter Meeting, Orlando, Florida, November 2018.
12. "Cesium and Strontium Concentration Profiling of the James River Watershed using Laser Induced Breakdown Spectroscopy (LIBS)," Poster, #Cano I, Willard C, \*Andrews H, Phongikaroon S. 2018 American Nuclear Society-Winter Meeting, Orlando, Florida, November 2018.
13. "Electrochemical Behavior of Alkali/Alkaline-Earths on Liquid Bi in LiCl-KCl Eutectic System," Presentation, \*Woods M, Phongikaroon S. 2018 International Pyroprocessing Research Conference, Tokai, Ibaraki, Japan, October 2018.
14. "The Effect of Temperature, Concentration, Electrode Gap, and Electrode Depth on Solution Resistance of  $GdCl_3$ -LiCl-KCl System," Presentation, \*Andrews H, Phongikaroon S. 2018 International Pyroprocessing Research Conference, Tokai, Ibaraki, Japan, October 2018.
15. "Diffusion Model and Artificial Neural Intelligence (ANI) Comparison for Cyclic Voltammetry Prediction of Uranium and Zirconium Chloride in LiCl-KCl Eutectic Salt," Presentation, \*Pouri S, Phongikaroon S, Wu Z. 2018 American Nuclear Society-Annual Meeting, Philadelphia, Pennsylvania, June 2018.

16. "Development of an Experimental Routine for Electrochemical and Laser-Induced Breakdown Spectroscopy Composition Measurements of LiCl-KCl Eutectic Salts," Presentation, \*Andrews H, Phongikaroon S. 2018 American Nuclear Society-Student Conference, Gainesville, Florida, April 2018.
17. "Electrochemical Impedance Spectroscopy of Cs and Ba in LiCl-KCl/Liquid Bi," Presentation, \*Woods M, Phongikaroon S. 2018 American Nuclear Society-Student Conference, Gainesville, Florida, April 2018.
18. "Observation and Quantification of Solvent Efficiency for Washing Electrorefined Uranium Dendrites in LiCl-KCl Eutectic Salt," Presentation, \*Killinger D, Phongikaroon S. 2018 American Nuclear Society-Student Conference, Gainesville, Florida, April 2018.
19. "Cesium and Strontium Concentration Profiling near Nuclear Power Plants using Laser Induced Breakdown Spectroscopy (LIBS)," Poster, #Cano I, \*Andrews H, Phongikaroon S. 2018 American Nuclear Society-Student Conference, Gainesville, Florida, April 2018.
20. "Compositional Analysis of Cerium in Rapid Setting Cement as an Immobilization Agent for Nuclear waste," Presentation, \*Motny R, Phongikaroon S. 2017 American Nuclear Society-Winter Meeting, Washington, D.C., November 2017.
21. "Fundamental Study of Uranium Morphology in LiCl-KCl Eutectic Salt," Poster, \*Killinger D, \*Woods M, #Baggett A, Phongikaroon S. 2017 American Nuclear Society-Winter Meeting, Washington, D.C., November 2017.
22. "Online Measurement of Cerium and Gadolinium in Pyroprocessing Salt via LIBS," Presentation, \*Williams AN, Bryce K, Phongikaroon S. 58<sup>th</sup> Institute of Nuclear material Management, Indian Wells, California, USA. July 2017.
23. "Implementing Artificial Neural Intelligence on Cyclic Voltammetry Method for Electrochemical Process Toward Pyroprocessing Safeguards Application," Presentation, \*Pouri SR, Wijayasekara DS, Manic M, Phongikaroon S. 58<sup>th</sup> Institute of Nuclear material Management, Indian Wells, California, USA. July 2017.
24. "Effects of GdCl<sub>3</sub> on U Electrochemical Properties in LiCl-KCl-UCl<sub>3</sub>-GdCl<sub>3</sub> Salt," Presentation, \*Yoon D, Phongikaroon S. 2017 American Nuclear Society-Annual Meeting, San Francisco, California, June 2017.
25. "Electrochemical and Thermodynamic Properties of U in LiCl-KCl-UCl<sub>3</sub> Salt System," Presentation, \*Yoon D, Phongikaroon S. 2017 American Nuclear Society-Annual Meeting, San Francisco, California, June 2017.
26. "Electrochemical Study of BaCl<sub>2</sub> and CsCl on Liquid Bismuth Cathode in LiCl-KCl Eutectic Salt, Presentation, \*Woods M, Phongikaroon S. 2017 American Nuclear Society-Annual Meeting, San Francisco, California, June 2017.
27. "Effect of Concentration, Temperature, and Interelectrode Gap on Voltage Drop in Electrochemical System of GdCl<sub>3</sub>-LiCl-KCl, Presentation, \*Andrews H, Phongikaroon S. 2017 American Nuclear Society-Annual Meeting, San Francisco, California, June 2017.
28. "Measurement of Exchange Current Density of LaCl<sub>3</sub> in LiCl-KCl Eutectic", Presentation, \*H. Andrews and S. Phongikaroon., Proceedings, 2017 International Congress on Advances in Nuclear Power Plants, Fukui and Kyoto, Japan, April 2017.
29. "Comprehensive Comparison of Exchange Current Density Acquisition Methods in Chloride Salts", Presentation, \*H. Andrews and S. Phongikaroon, 2017 American Nuclear Society Student Conference, Pittsburgh, Pennsylvania, April 2017.
30. "Exchange Current Density Analysis of High Concentration LaCl<sub>3</sub> in LiCl-KCl Eutectic Salt," Poster, #Rodrigues B, \*Andrews H, Phongikaroon S. 2017 American Nuclear Society Student Conference, Pittsburgh, Pennsylvania, April 2017.
31. "Development of a Smart Signal Detection Method for Cyclic Voltammetry via Artificial Neural Intelligence," \*Pouri SR, Wijayasekara DS, Manic M, Phongikaroon S. 2016 American Nuclear Society-Winter Meeting, Las Vegas, Nevada, November 2016.

32. "Comparison of Experimental Exchange Current Density Acquisition Methods for La/La<sup>3+</sup> in LiCl-KCl Eutectic Salt," Poster, \*Andrews H, Phongikaroon S. 2016 American Nuclear Society-Winter Meeting, Las Vegas, Nevada, November 2016.
33. "Measurement and Analysis of Exchange Current Density of Lanthanides in LiCl-KCl Eutectic Salt," Poster, \*Andrews H, \*Yoon D, Kim SH, Phongikaroon S. 2016 American Nuclear Society-Winter Meeting, Las Vegas, Nevada, November 2016.
34. "Electrochemical and Thermal Behavior of BaCl<sub>2</sub> on a Liquid Bi Electrode in LiCl-KCl Melts," Poster, \*Woods M, #Temjiraseranee C, Phongikaroon S. 2016 American Nuclear Society-Winter Meeting, Las Vegas, Nevada, November 2016.
35. "Assessment of Laser-Induced Breakdown Spectroscopy (LIBS) Technique in Molten Salt Aerosol," Presentation, \*Williams AN, Phongikaroon S. 2016 International Pyroprocessing Research Conference, Jeju city, South Korea, September 2016.
36. "Laser-Induced Breakdown Spectroscopy (LIBS) Measurement of Uranium in Electrorefiner Molten Salt," Presentation, \*Williams AN, Phongikaroon S. 2016 International Pyroprocessing Research Conference, Jeju city, South Korea, September 2016.
37. "Measurement and Analysis of Exchange Current Density for U/U<sup>3+</sup> Reaction in LiCl-KCl Eutectic via Various Electrochemical Techniques," Presentation, \*Yoon D. and Phongikaroon S. 2016 International Pyroprocessing Research Conference, Jeju city, South Korea, September 2016.
38. "Laser-Induced Breakdown Spectroscopy (LIBS) Determination of Cerium and Uranium in Molten Salt Aerosol," Presentation, \*Williams AN, Phongikaroon S. 57<sup>th</sup> Institute of Nuclear material Management, Atlanta, Georgia, USA. July 2016.
39. "Electrochemical Data Analysis and Simulation via Artificial Neural Intelligence for Pyroprocessing Safeguards Application," \*Pouri SR, Wijayasekara DS, Manic M, Phongikaroon S. 57<sup>th</sup> Institute of Nuclear material Management, Atlanta, Georgia, USA. July 2016.
40. "Investigation on Reaction Probabilities for Cyclic Voltammetry of Zirconium in LiCl-KCl Eutectic Molten Salt via Reverse-Engineering Method," \*Pouri SR, Phongikaroon S. 2016 ANS Annual Conference, New Orleans, Louisiana, USA. June 2016.
41. "An initial study of uranium morphology," \*Marsden KC, Phongikaroon. 2016 ANS Annual Conference, New Orleans, Louisiana, USA. June 2016.
42. "Reverse Cyclic Voltammetry Method Interaction With Graphical user Interface for Electrochemical Processes of Used Nuclear Fuel," Presentation, \*Pouri SR, Phongikaroon S. 24<sup>th</sup> International Conference on Nuclear Engineering, Charlotte, North Carolina, USA, June 2016.
43. "Optimization of Laser-Induced Breakdown Spectroscopy Parameters in a Novel Molten Salt Aerosol System," Presentation, \*Williams AN, Phongikaroon S. 24<sup>th</sup> International Conference on Nuclear Engineering, Charlotte, North Carolina, USA, June 2016.
44. "Evaluation of Thermodynamic Properties of Cerium in Liquid Cadmium Cathode within LiCl-KCl Salt System," Presentation, \*Yoon D, Phongikaroon S. 24<sup>th</sup> International Conference on Nuclear Engineering, Charlotte, North Carolina, USA, June 2016.
45. "Electrochemical Properties and Analyses of BaCl<sub>2</sub> in LiCl-KCl Eutectic Salt," Presentation, \*Woods M, Phongikaroon S. 2016 ANS Student Conference, Madison, Wisconsin, USA, April 2016.
46. "Measurement and Analysis of Exchange Current Density of Lanthanides in LiCl-KCl Eutectic Salt," \*Andrews HB, \*Yoon D, \*Kim SH, Phongikaroon S. 2016 ANS Student Conference, Madison, Wisconsin, USA, April 2016.
47. "Differential Scanning Calorimetry Study of the Thermal Properties of Barium Chloride in Eutectic Lithium Chloride-Potassium Chloride," Poster, #Bauserman D, \*Woods M, Phongikaroon S. 2016 ANS Student Conference, Madison, Wisconsin, USA, April 2016.
48. "LIBS Analysis of Gd and Ce in Solid LiCl-KCl-GdCl<sub>3</sub>-CeCl<sub>3</sub> Salt Samples," Presentation, \*Bryce KC, \*Williams AN, \*Kim SH, Phongikaroon S. 2015 ANS Winter Conference, Washington, DC, USA, November 2015.

49. “Electrochemical Detection and Analysis of a Molten LiCl-KCl Eutectic Containing Multiple Lanthanides,” Presentation, Kim SH, \*Yoon D, Phongikaroon S. 2015 ANS Winter Conference, Washington, DC, USA, November 2015.
50. “The Remote Compositional Analysis of Molten Salt by Probe Assisted In-Situ LIBS System,” Poster, Kim SH, Lee, J, Phongikaroon S. 2015 ANS Winter Conference, Washington, DC, USA, November 2015.
51. “Elemental Detection of Cerium and Gadolinium in Aqueous Aerosols via LIBS,” Presentation, \*Williams AN, Phongikaroon S. GLOBAL 2015, Paris, France, September 2015.
52. “Measurement of Cerium in Molten Salt Aerosol via LIBS,” Presentation, \*Williams AN, Phongikaroon S. GLOBAL 2015, Paris, France, September 2015.
53. “Measurements of CeCl<sub>3</sub> Properties on Liquid Cadmium Cathode (LCC) in LiCl-KCl Eutectic Salt as a Basic Safeguarding Application in Pyroprocessing Technology,” Presentation, \*Yoon D, Phongikaroon S., GLOBAL 2015, Paris, France, September 2015.
54. “Separation of SrCl<sub>2</sub> and CsCl From Ternary SrCl<sub>2</sub>-LiCl-KCl and Quaternary SrCl<sub>2</sub>-CsCl-LiCl-KCl Molten Salts via Melt Crystallization,” Presentation, \*William AN, \*Pack M, Phongikaroon S. 2014 ANS-Winter Meeting, California, November 2014.
55. “Measurements of CeCl<sub>3</sub> in LiCl-KCl Eutectic Salt via Cyclic Voltammetry and Electrochemical Impedance Spectroscopy,” Presentation, \*Yoon D, Phongikaroon S. 2014 IPRC, Idaho Falls, Idaho, USA, October 2014.

*Student Posters and Presentations Given at Conferences (At Previous Institution)*

1. “Electrochemical Measurement and Analysis of Molten Lithium Chloride-Potassium Chloride and Cadmium Metal System,” Presentation, \*Shaltry MR, Phongikaroon S, Simpson MF. 2014 IPRC, Idaho Falls, Idaho, USA, October 2014.
2. “Effects of Temperature, Concentration and Uranium Content on Zirconium Electrochemistry in LiCl-KCl Eutectic Molten Salt,” Presentation, \*Hoover RO, Phongikaroon S. 2014 IPRC, Idaho Falls, Idaho, USA, October 2014.
3. “Laser Induced Breakdown Spectroscopy (LIBS) Study in a Flowing Molten Salt,” Presentation, \*Williams AN, Phongikaroon S. 2013 ANS Winter Meeting, Washington, D.C., November 2013.
4. “Electrochemical Behavior of Zirconium and Uranium Chlorides in the LiCl-KCl Eutectic,” Presentation, \*Hoover RO, Phongikaroon S, Simpson MF. 2013 GLOBAL, Salt Lake City, UT, September 2013.
5. “Fission Product Separation from Pyrochemical Electrolyte by Cold Finger Melt Crystallization,” Presentation, \*Versey JR, Phongikaroon S, Simpson MF. 2013 GLOBAL, Salt Lake City, UT, September 2013
6. “The U.S. Pyrochemical Research—University and National Laboratory Collaboration,” Phongikaroon S. Physics Departmental Seminar, Texas A&M University, TX, March 2013.
7. “Electrochemical Studies and Analysis of Uranium Chloride in Molten LiCl-KCl Eutectic,” Presentation, Hoover R, Shaltry M, Phongikaroon S, Martin S, Sridharan K, Simpson M. 2013 TMS Conference, San Antonio, TX, March 2013.
8. “Sensor Technology for Real Time Monitoring of Molten Salt Electrolyte During Nuclear Fuel Electrorefining,” Presentation, Simpson M, Fredrickson G, Serrano-Rodriguez B, Gese N, Phongikaroon S, Allahar K. 2013 TMS Conference, San Antonio, TX, March 2013.
9. “Electrochemical Impedance Spectroscopy of LaCl<sub>3</sub>, ZrCl<sub>4</sub>, and UCl<sub>3</sub> in Molten LiCl-KCl Eutectic,” Presentation, Allahar K, \*Shaltry M, Orazem M, Butt D, Phongikaroon S, Simpson M. 2013 TMS Conference, San Antonio, TX, March 2013.
10. “Zirconium and Uranium Electrochemistry in Molten LiCl-KCl Eutectic System,” Presentation, \*Hoover R, Phongikaroon S, Simpson MF. 2012 International Workshop on Nuclear Pyroprocessing, Daejeon, Korea, December 2012.
11. “Electrochemical zirconium recovery experiments in molten salt system,” Presentation, \*Hoover R, \*Shaltry M, Phongikaroon S, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.

12. "Study of oxidative precipitation of rare-earth chlorides in molten salt in a transparent furnace system," Poster, \*Pack M, Phongikaroon S, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
13. "Salt preparation and reconditioning for accelerator driven subcritical fission in molten salt (ADSMS)," Presentation, \*Sooby E, Gerity J, McIntyre P, Phongikaroon S, Progue N, Sattarov A, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
14. "Effect of temperature variation on LIBS spectra of molten salt," Presentation, \*Hanson C, Phongikaroon S, Hatch JJ, Scott JR. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
15. "Zone freezing study for pyrochemical process waste minimization," Presentation, \*Williams AN, Phongikaroon S, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
16. "Fission product separation by cold finger crystal growth," Poster, \*Versey JR, Phongikaroon S, Simpson MF. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
17. "Zone freezing modeling and experimentation for pyroprocessing waste minimization," Poster, \*Williams AN, Phongikaroon S, Simpson MF. 2012 American Nuclear Society—Student Conference, Las Vegas, NV, April 2012. Session: 1<sup>st</sup> PLACE WINNER
18. "Electrochemical study of Zr(IV) diffusion in the molten LiCl/KCl/Cd system," Poster, \*Hoover RO, Phongikaroon S, Simpson MF, Yoo TS. 2012 American Nuclear Society—Student Conference, Las Vegas, NV, April 2012. Session: 3<sup>rd</sup> PLACE WINNER
19. "Diffusion coefficient of Zr<sup>4+</sup> in the molten LiCl-KCl eutectic system," Presentation, \*Hoover RO, Phongikaroon S, Simpson MF, Yoo TS. 2011 American Nuclear Society—Winter Meeting, Washington, DC, November 2011.
20. "Separation of CsCl from a ternary CsCl-LiCl-KCl salt via a zone freezing method," Poster, \*Williams AN, Phongikaroon S, Simpson MF. 2011 American Nuclear Society—Winter Meeting, Washington, DC, November 2011.
21. "Candidate Heavy Salt Systems for Accelerator-Driven Sub-Critical Molten Salt Fission," Presentation, \*Sooby E, McIntyre P, Tripathy P, Simpson MF, Phongikaroon S. 2011 American Nuclear Society—Winter Meeting, Washington, DC, November 2011.
22. "Effect of oxygen bubble distributions on rare earth precipitates in molten salt," Presentation, \*Bezzant RW, Phongikaroon S, Simpson MF. 2011 AIChE Annual Meeting, Minneapolis, Minnesota, October 2011.
23. "Kinetic study of ion exchange between multivalent cations and zeolite-4A in a molten salt," Presentation, \*Shaltry MR, Phongikaroon S, Simpson MF. 2010 AIChE Annual Meeting, Salt Lake City, Utah, November 2010.
24. "Modeling of zone freezing for pyrochemical process waste minimization," Presentation, \*Williams AN, Phongikaroon S, Simpson MF. AIChE Annual Meeting, Salt Lake City, Utah, November 2010.
25. "Comparison of anodic signals from the Mark-IV electrorefiner using statistical invariance and direct computational modeling," Presentation, \*Hoover RO, Phongikaroon S, Yoo T-S, Simpson MF. AIChE Annual Meeting, Salt Lake City, Utah, November 2010.
26. "Computational model of the Mark-IV electrorefiner—2D potential and current distributions," Presentation, \*Hoover RO, Phongikaroon S, Simpson MF, Yoo T-S, Li SX. AIChE Annual Meeting, Nashville, Tennessee, November 2009.

*Posters and Presentations Given at Conferences by Colleagues from Other Organizations/Institutions*

1. "Selective precipitation of rare earth chlorides from LiCl-KCl," Presentation, Simpson MF, Yoo TS, \*Shaltry M, Phongikaroon S, Labrier D, Lineberry M. 2012 International Pyroprocessing Research Conference, Fontana, WI, August 2012.
2. "Immobilization of salt from zone freezing process in zeolite-A," Presentation, Simpson MF, Allensworth JR, \*Shaltry M, Phongikaroon S. 2010 International Pyroprocessing Research Conference, Dimitrovgrad, Russia, December 2010.



3. “Development of a computational model for the Mark-IV electrorefiner—cathodic exchange current density study,” Presentation, \*Hoover RO, Phongikaroon S, Simpson MF, Yoo T-S, Li SX. NUPYRO 2009, Jeju Island, Korea, May 2009.
4. “Hydrodynamic response of a free surface to a transient gas jet,” Presentation, Judd KP, Phongikaroon S, Smith GB, Handler RA. 56<sup>th</sup> Annual APS Meeting: Division of Fluid Dynamics, NYC/New Jersey, November, 2003.
5. “The surface thermal structure of an unsteady Reynolds ridge and associated instabilities,” Presentation, Judd KP, Phongikaroon S, Smith GB, Handler RA. 55<sup>th</sup> Annual APS Meeting Division of Fluid Dynamics, Dallas, TX, November, 2002.
6. “Adsorption kinetics at liquid-liquid interfaces for application to emulsification processes,” Presentation, Green J., Sunshine G, Calabrese RV, Phongikaroon S, Padron GA. 3<sup>rd</sup> World Congress on Emulsions, Lyon, France, September, 2002.
7. “Fluid dynamics and emulsification in high shear mixers,” Presentation, Calabrese RV, Francis MK, Kevala KR, Mishra VP, Padron GA, Phongikaroon S. 3<sup>rd</sup> World Congress on Emulsions, Lyon, France, September, 2002.

### Grants and Contracts

#### Awarded

Current total funding – \$3,842,492 (51% as the lead PI)

Total funding since joining VCU – \$2,109,363 (50% as the lead PI)

<u>Years</u>	<u>Project</u>	<u>Sponsor</u>	<u>Total Funding</u> <sup>3</sup>	<u>Collaborators</u>
10/2018 - 10/2020	Development of an Experiment Vehicle for In Situ Process Monitoring and Ex Situ chemical Analysis of irradiated Molten Salt (co-PI)	Department of Energy (DOE) - Vertical Test Reactor Program (VTR)	\$277,975	U of Utah (PI), U of Michigan
08/2019 - 05/2020	Off-gas Detection from Molten Salt Using Optical Spectroscopy (PI)	Oak Ridge National Laboratory	\$52,331	None
08/2018 - 08/2019	X-ray Diffraction System to Enhance VCU Nuclear materials Research and Education (PI)	DOE - Scientific Infrastructure Award	\$154,065	VCU (co-PI)
12/2017 - 12/2019	Fundamental Data toward Silver-Silver Chloride Reference Electrodes (PI)	Idaho National Laboratory (INL)	\$140,000	None
12/2017 - 09/2019	Fundamental Study of Uranium Morphology in LiCl-KCl Eutectic (PI)	INL	\$160,000	None

<sup>3</sup> Funding awarded to Dr. Phongikaroon.

09/2015 - 09/2018	Fundamental Electrochemical Properties of Liquid Metals in LiCl-KCl for Separation of Alkali/Alkaline-Earths (Cs, Sr and Ba) (co-PI)	DOE - Nuclear Energy University Program (NEUP)	\$240,000	Penn State (PI), Argonne National Laboratory (ANL)
09/2014 - 09/2017	Development and Optimization of Voltammetric Methods for Real Time Analysis of Electrorefiner Salt with High Concentrations of Actinides and Fission (co-PI)	DOE – NEUP	\$244,992	U of Utah (PI), Ohio State
09/2013 - 09/2016	Safeguards in Pyroprocessing: An Integrated Model Development and Measurement Data Analysis (co-PI) <sup>4</sup>	DOE – NEUP	\$300,000	Ohio State (PI)
09/2012 - 02/2016	Measurement of Irradiated Pyroprocessing Samples via Laser Induced Breakdown Spectroscopy (PI) <sup>5</sup>	DOE – NEUP	\$820,000	INL, Lawrence Berkeley National Laboratory (LBNL)
09/2012 - 09/2013	Study of Electrochemical Deposition of Actinides in Molten Cadmium (PI)	National Nuclear Security Administration (NNSA)	\$100,000	INL
04/2011 - 09/2013	Study of Chemical and Electrochemical Removal of Contaminants from Electrorefiner Salt (co-PI from the U.S. side)	DOE-Internal Nuclear Energy Research Initiative (INERI)	\$459,844	INL, Seoul National University (SNU), Korea Atomic Energy Research Institute (KAERI)
12/2011 - 09/2012	Study of Electrorefiner Salt Waste Minimization and Corrosion Testing (PI)	INL	\$76,364	None
10/2011 - 09/2012	Study of Kinetics of Fission Products (PI)	INL	\$52,266	None

<sup>4</sup> The contract of this grant started directly at VCU.

<sup>5</sup> The amount of \$540,000 was transferred to VCU.

10/2010 - 10/2011	Study of Zone Freezing (PI)	Center for Advanced Energy Studies Laboratory Directed Research and Development (CAES - LDRD)	\$54,999	None
10/2010 - 10/2011	Study of Kinetics of Fission Product Ion Exchange into Zeolite A - Part II: Oxygen Sparging (PI)	INL	\$64,132	None
09/2010 - 09/2011	Optimization of Ceramic Waste Forms Used for Electrochemical Processing of Spent Nuclear Fuel—Zone Freezing (PI)	CAES – LDRD	\$46,709	None
09/2009 - 10/2010	Study of Kinetics of Fission Product Ion Exchange into Zeolite A (PI)	INL	\$53,162	None
11/2007 - 11/2010	Development of a Computational Model for Pyrochemical Electrorefiners of Nuclear Waste Transmutation System (co-PI from the U.S. side)	DOE – INERI	\$303,178	INL, SNU, KAERI
04/2009 - 11/2009	Development of a Kinetics Model for Electrolytic Reduction of Oxide Fuel (PI)	INL	\$48,675	None
03/2009 - 09/2009	Elucidation on Kinetics of Ion Exchange for Quaternary Systems (PI)	INL	\$55,221	None
05/2008 - 05/2009	Energy, Sustainability and Modeling (co-PI)	University of Idaho - Greening the Curriculum Initiative	\$3,000	U of Idaho
03/2008 - 09/2008	Kinetics Study for Ion Exchange	INL	\$75,100	None
12/2007 - 08/2008	Development of a Kinetics Model for Electrolytic Reduction of Oxide Fuel (co-PI)	DOE – INERI	\$60,479	INL, KAERI
<u>Current Total Funding Since 2007</u>			\$3,842,492	

**Pending/unfunded Proposals (since joining VCU)**

<u>Year</u>	<u>Project</u>	<u>Sponsor</u>	<u>Expected Funding<sup>6</sup></u>	<u>Collaborators</u>
2020	Measurement and Analysis of Thermophysical Properties of Supercritical CO <sub>2</sub> (PI)	McDermott	\$253,549	None
2020	Development of Multi-Center University Molten Salt Reactor Research Infrastructure (co-PI)	DOE - Integrated Research Project (IRP)	\$900,000	MF Simpson (U of Utah - PI), Penn State, Virginia Tech, U of Michigan, ORNL, ANL
2020	Bulk Actinide Quantification by Combining Complementary NDA Measurements and Computer Modeling (co-PI)	DOE - NEUP	\$160,000	B Goddard (VCU - PI), INL
2019	Advanced Experimental Suite Using Electrochemistry, X-Ray and Neutron Scattering, and Laser Spectroscopy for Understanding Molten Salt Structure and Speciation with Artificial Neural Network (PI)	DOE - NEUP	\$800,000	U of Florida, ORNL
2019	Novel Inspection Suite with Artificial Neural Intelligence for Advancing Data Analytics of Equipment Condition in Nuclear Power Plant (PI)	DOE - NEUP	\$800,000	VCU, Iowa State U, Framatome, Dominion Energy
2018	Consortium Enabling Technologies and Innovation (co-PI)	NNSA	\$1,500,000	J Baciak (U of Florida - PI), etc.
2018	Consortium for Monitoring, Technology and Verification (co-PI)	NNSA	\$1,600,000	E. Liu (RPI - PI), etc.
2018	Special Material Analysis via Robotic Technology & Artificial Neural Intelligence (SMART&ANI) – Innovation for Future Nuclear Power Plants (PI)	MEITNER-ARPA-E	\$1,900,000	VCU, Iowa State U, Framatome, Dominion Energy
2018	Separation of Fission Chlorides (CsCl and SrCl <sub>2</sub> ) Using Vertical Zone Refining Technique for Pyrochemical Process Waste Minimization (PI)	DOE - NEUP	\$350,000	INL

<sup>6</sup> Expected funding to Dr. Phongikaroon prior subcontracting to other if any.

2018	Advanced Experimentations with Ab-initio and Physics-Based Computational Models for Understanding the Molten Salt Structure and Speciation (PI)	DOE - NEUP	\$800,000	VCU, U of Florida, Framatome
2018	Advanced Data Integration for Materials Accounting of a Commercial Pyroprocessing System	DOE - NEUP	\$260,000	R Borrelli (U of Idaho - PI), INL
2018	Integration of Radiation Detection, Spectroscopy, and Electrochemical Measurements for Enhanced Safeguards of a Nuclear Fuel Reprocessing Facility	DOE - NEUP	\$252,000	MF Simpson (U of Utah - PI), Penn State.
2017	Interactive Tool for Nuclear Fuel Cycle Analysis via Artificial Neural Intelligence (PI)	DOE - NEUP	\$400,000	VCU
2017	Fundamental Electrochemical Studies and Material Characterizations of Tellurium and Iodine in LiCl-KCl salt for Pyroprocessing Technology (PI)	DOE - NEUP	\$800,000	Purdue U, INL, Oklo Inc.
2016	Development of an Advanced Chloride Salt Distillation Process (co-PI)	DOE - NEUP	\$300,000	MF Simpson (U of Utah - PI), ORNL
2016	Advanced Safeguards Data Integration for Electrochemical Process of Used Nuclear Fuel through Artificial Neural Intelligence (PI)	DOE - NEUP	\$800,000	VCU, Framatome
2015	Inspection and Computer Assisted Virtual Environment - Innovative Techniques for Used Nuclear Fuel Cask Condition Evaluation (PI)	DOE - IRP	\$2,995,322	VCU, Iowa State U, Sweet Briar College, Dominion Energy, INL
2014	Safeguards in Pyroprocessing: An Integrated Model Development and Measurement Data Analysis (co-PI)	DOE - NEUP	\$282,777	R Cao (Ohio State U - PI)

2014	Separating Lanthanides and Actinides in Molten Salt Using Electrokinetic Techniques (co-PI)	DOE – NEUP	\$234,614	M Deinert (Texas-Austin - PI), INL
2014	Robotic Inspection and Computer Assisted Virtual Environment (RICAVE)—Innovative Sensors and Delivery Devices for Used Nuclear Fuel Dry Cask Storage (PI)	DOE – IRP	\$3,000,000	VCU, UVA, Iowa Stat U, U of Idaho, Idaho State U, Sweet Briar College, AREVA, Dominion Energy, INL, SNU
2014	MRI: Acquisition of Laser-Ablation Inductively Coupled Plasma Mass Spectrometry for Research, Education, and Training at VCU	NSF	\$242,145	VCU

### SERVICE ACTIVITIES:

#### Departmental Service

- VCU-Director of Nuclear Engineering Program (2018 – present)
- VCU-Nuclear Regulatory Commission (NRC) Undergraduate Scholarship Committee Member (2018 – present)
- VCU-Nuclear Engineering Abroad Program Scholarship Committee Chair (2019)
- VCU-Peer Review Committee for Mid-Tenure Review (2017, 2020)
- VCU-ABET Document Preparation for Nuclear Engineering Program (2018)
- VCU-Peer Review Committee for Promotion/Tenure (2016)
- VCU-Mechanical and Nuclear Engineering Graduate Committee Member (2014 – Present)
- VCU-Nuclear Engineering Faculty Search Committee Member (2014)
- VCU-Mechanical and Nuclear Engineering PhD Qualifying Examiner/Observer (2014, 2016, 2018)
- University of Idaho (UI)-Lead for the Center for Advanced Energy Studies (CAES) Operating Envelope (2009 – 2013)
- UI-Search Committee Member for the Chemistry faculty position at CAES (2009)

#### College Service

- VCU-College of Engineering, Promotion and Tenure Committee Member (2017 – 2018); Chair (2019)
- VCU-University Council Members from the School of Engineering (2014 – 2016)
- UI-Search Committee Chair for the Director of Academic Program/Associate Dean of Engineering, Idaho Falls Campus (2013)
- UI-CAES Radiochemistry Laboratory Lead (2009 – 2013)
- UI-CAES Analytical Chemistry Laboratory Lead (2009 – 2010)

#### Professional Society Service

- VCU Chapter-ANS Student Advisor (2018 – 2019); Support the *2019 ANS Student Conference* hosted by VCU in Richmond, VA (the largest student conference in the nation) (April 2019)
- Technical Lead of the 2018 Science Teacher Workshop for the Virginia Local Section – American Nuclear Society (VA-ANS) (2018)
- Technical Organizing Committee Member for the International Pyroprocessing Research Conference (2014, 2016)

- Session chair (GLOBAL Conference, 2019; AIChE Conference, 2008, 2009, 2011, 2012, 2013, 2014, 2019; International Pyroprocessing Research Conference, 2006, 2014, 2016, 2018)
- Chair of Award Committee for the Nuclear Engineering Division (NED)-American Institute of Chemical Engineers (AIChE) Outstanding Student Paper & Presentation Awards (2007 – 2013)
- Technical Program Committee for the NUPYRO 2009—International Workshop on Nuclear Pyroprocessing (2009)
- Technical Program Committee for the Idaho University Consortium (IUC), Academic Center of Excellence (ACE)—High-Level Nuclear Waste Workshop and Short Course (May 2008)
- Chair, NED-AIChE (2013 – 2014); Vice Chair (2011 – 2013); Member (2008 – present)
- Chair, VA-ANS (2016 – 2017); Vice Chair (2015 – 2016); Member (2014 – present)
- Professional Member, ANS (2008 – present)
- Professional Member, AIChE (2001 – present)
- Professional Member, Institute of Nuclear Materials Management (INMM) (2015 – present)
- Reviewer for various journals (*Experiments in Fluids* (1-2 yearly), *Nuclear Technology* (3-4 yearly), *Nuclear Engineering and Technology* (2-3 yearly), *Journal of Nuclear Fuel Cycle and Waste Technology* (2-4 yearly), *Journal of Nuclear Materials* (2-3 yearly), *Journal of the Electrochemical Societies* (2-3 yearly), *AIChE Journal* (1 yearly), and *Industrial & Engineering Chemistry Research* (1 yearly), reports and proposals from DOE-SBIR (2-4 yearly) and DOE-NEUP (2 yearly).

#### **International, National, State or Governmental Service**

- Editor Board Member of *Journal of Nuclear Fuel Cycle and Waste Technology* (2020 – present)
- Member of Nuclear Engineering Department Head Organization (2018 – present)
- Board of Directors of Virginia Nuclear Energy Consortium (VNEC) (2018 – present); Vice Chair (2018 – 2019); Treasurer (2019 – present)
- Selection Panelist for DOE-NEUP – Graduate Fellowship (2016, 2017, 2018)
- Member of Advisory Board for 3<sup>rd</sup> PyroGreen International Forum, Jeju City, South Korea (September 2016)
- Selection Panelist for DOE-IRP (2016)
- Selection Panelist for DOE-NEUP – Scientific Infrastructure Support for Consolidated Innovate Nuclear Research (2015)

#### **Community Outreach Service**

- Guest Speaker on “Nuclear Energy” at Maggie L. Walker Governor’s School (2020)
- Guest Speaker on “Nuclear Science” at George H. Moody Middle School (2018)
- Speaker at the Nuclear Science Teacher Workshop held in Richmond, Virginia (2014, 2015, 2016, and 2017)
- Speaker at the VCU-ANS-Girl Scouts Get to Know Nuclear Workshop held in Richmond, Virginia (November 2014)
- Lecturer and Exhibition Leader at High School Students Expo held in Idaho Falls (2008, 2009)

#### **Professional Development**

- Attended Molten Salt Reactor Workshop, ORNL, Oak Ridge, TN (October 2 – 3, 2019)
- Attended the US Faculty Tour of French Nuclear Facilities (July 3 – 9, 2016)
- Attended the DOE – NEUP Workshop, Rockville, MD (July 27 – 28, 2010)
- Attended the AIChE – Leadership Development Conference, Kingsport, TN (June 4 – 6, 2010)
- Attended the ACE – High Level Nuclear Waste Workshop, Idaho Falls, ID (May 5 – 7, 2008)
- Attended the DOE – Nuclear Energy Workshop, Rockville, MD (August 18 – 20, 2008)