

**TENURE AND PROMOTION CURRICULUM VITAE  
OF  
ZHE CHENG, DEPARTMENT OF MECHANICAL & MATERIALS ENGINEERING**

**EDUCATION**

<i>Degree</i>	<i>Institution</i>	<i>Field</i>	<i>Dates</i>
Ph.D.	Georgia Institute of Technology	Materials Sci. & Eng.	01/2005 - 05/2008
M.S.	Georgia Institute of Technology	Materials Sci. & Eng.	08/2001 - 12/2004
B.S.	Tsinghua Univ. (Beijing, China)	Materials Sci. & Eng.	09/1997 - 06/2001

**FULL-TIME ACADEMIC EXPERIENCE**

<i>Institution</i>	<i>Rank</i>	<i>Field</i>	<i>Dates</i>
N/A			

**PART-TIME ACADEMIC EXPERIENCE**

<i>Institution</i>	<i>Rank</i>	<i>Field</i>	<i>Dates</i>
N/A			

**NON-ACADEMIC EXPERIENCE**

<i>Place of Employment</i>	<i>Title</i>	<i>Dates</i>
DuPont, Central Research & Development	Research Investigator	06/2008 - 04/2013

**EMPLOYMENT RECORD AT FIU**

<i>Rank</i>	<i>Dates</i>
Assistant Professor, Department of Mechanical & Materials Engineering	08/2013 - current

**PUBLICATIONS IN DISCIPLINE**

*Citations based on Google Scholar*

- <https://scholar.google.com/citations?user=-3eZMkQAAAAJ&hl=en>
- **Total citations for Dr. Zhe Cheng: 2998** (as of 2018-08-29)
  - Citations for all papers since joining FIU (2013): 1782
  - Citations for new papers published since joining FIU: 100
- **h-index 19**
- **i10-index 24**

**Books**

N/A

*Peer-reviewed Journal Articles (\* for corresponding author, underline for postdoc/graduate/undergraduate students directly supervised by Zhe Cheng)*

1. Sun, Shichen; **Cheng, Zhe\***. "H<sub>2</sub>S poisoning of proton conducting solid oxide fuel cell and comparison with conventional oxide-ion conducting solid oxide fuel cell," *Journal of the Electrochemical Society* (2018), 165 (10), F836-F844. [DOI:10.1149/2.0841810jes](https://doi.org/10.1149/2.0841810jes)

2. Xing, Junheng; Foroughi, Paniz; Hernandez, Alexander Franco; Behrens, Andrés; **Cheng, Zhe\***. “Facile one-step high-temperature spray pyrolysis route toward metal carbide nanopowders,” *Journal of the American Ceramic Society* (2018). [DOI:10.1111/jace.15785](https://doi.org/10.1111/jace.15785)
  3. Foroughi, Paniz; Rabiei Baboukani, Amin; Hernandez, Alexander Franco; Wang, Chunlei; **Cheng, Zhe\***. “Phase Control during Synthesis of Nanocrystalline Ultrahigh Temperature Tantalum-Hafnium Diboride Powders,” *Journal of the American Ceramic Society* (2018). [DOI:10.1111/jace.15783](https://doi.org/10.1111/jace.15783)
  4. Sun, Shichen; Awadallah, Osama; **Cheng, Zhe\***. “Poisoning of Nickel Based Anode for Proton Conducting Solid Oxide Fuel Cells by Hydrogen Sulfide, Carbon dioxide, and Moisture as Fuel Contaminants,” *Journal of Power Sources* (2018), 378, 255-263. [DOI:10.1016/j.jpowsour.2017.12.056](https://doi.org/10.1016/j.jpowsour.2017.12.056)
  5. Awadallah, Osama; **Cheng, Zhe\***. “Study of the fundamental phase formation mechanism of sol-gel sulfurized  $\text{Cu}_2\text{ZnSnS}_4$  thin films using in situ Raman spectroscopy,” *Solar Energy Materials and Solar Cells* (2018), 176, 222-229. [DOI:10.1016/j.solmat.2017.11.038](https://doi.org/10.1016/j.solmat.2017.11.038)
  6. Foroughi, Paniz; **Cheng, Zhe\***. “Controlling phase separation of  $\text{Ta}_x\text{Hf}_{1-x}\text{C}$  solid solution nanopowders during carbothermal reduction synthesis,” *Journal of the American Ceramic Society* (2017), 100 (11), 5056-5065. [DOI:10.1111/jace.15065](https://doi.org/10.1111/jace.15065)
  7. Sun, Shichen; **Cheng, Zhe\***. “Electrochemical Behaviors for Ag, LSCF and BSCF as Oxygen Electrodes for Proton Conducting IT-SOFC,” *Journal of the Electrochemical Society* (2017), 164(10), F3104-F3113. [DOI:10.1149/2.0121710jes](https://doi.org/10.1149/2.0121710jes)
  8. Awadallah, Osama; **Cheng, Zhe\***. “Formation of sol-gel based  $\text{Cu}_2\text{ZnSnS}_4$  thin films using ppm-level hydrogen sulfide,” *Thin Solid Films* (2017), 625 (1), 122-130. [DOI:10.1016/j.tsf.2017.01.054](https://doi.org/10.1016/j.tsf.2017.01.054)
  9. Sun, Shichen; **Cheng, Zhe\***. “Effects of  $\text{H}_2\text{O}$  and  $\text{CO}_2$  on Electrochemical Behaviors of BSCF Cathode for Proton Conducting IT-SOFC,” *Journal of the Electrochemical Society* (2017), 164(2), F81-F88. [DOI:10.1149/2.0611702jes](https://doi.org/10.1149/2.0611702jes)
  10. **Cheng, Zhe\***; Foroughi, Paniz; Behrens, Andrés. “Synthesis of nanocrystalline TaC powders via single-step high temperature spray pyrolysis from solution precursors,” *Ceramics International* (2017), 43(3), 3431-3434. [DOI:10.1016/j.ceramint.2016.11.177](https://doi.org/10.1016/j.ceramint.2016.11.177)
  11. Foroughi, Paniz; **Cheng, Zhe\***. “Understanding the morphological variation in the formation of  $\text{B}_4\text{C}$  via carbothermal reduction reaction,” *Ceramics International* (2016), 42(14), 15189-15198. [DOI:10.1016/j.ceramint.2016.06.126](https://doi.org/10.1016/j.ceramint.2016.06.126)
  12. Awadallah, Osama; **Cheng, Zhe\***. “In Situ Raman Monitoring of  $\text{Cu}_2\text{ZnSnS}_4$  Oxidation and Related Decomposition at Elevated Temperatures,” *IEEE Journal of Photovoltaics* (2016), 6(3), 764-769. [DOI:10.1109/JPHOTOV.2016.2542479](https://doi.org/10.1109/JPHOTOV.2016.2542479)
  13. VahidMohammadi, Armin; **Cheng, Zhe\***. “Fundamentals of Synthesis, Sintering, and Chemical Stability Issues of  $\text{BaZr}_{0.1}\text{Ce}_{0.7}\text{Y}_{0.1}\text{Yb}_{0.1}\text{O}_{3-\delta}$  Proton Conducting Electrolyte for SOFCs,” *Journal of Electrochemical Society*, (2015), 162 (8), F803-811. [DOI:10.1149/2.0021508jes](https://doi.org/10.1149/2.0021508jes)
- Joined FIU in 08/2013 -
14. **Cheng, Zhe**; Wang, Jeng-Han; Choi, Yong-Man; Lin, M. C.; Liu, Meilin\*. “From Ni-YSZ to sulfur-tolerant anode materials for SOFCs: electrochemical behavior, *in situ* characterization, modeling, and future perspectives,” *Energy & Environmental Science* (2011), 4(11), 4380-4409. (*Invited perspectives*)
  15. Yang, Lei; **Cheng, Zhe**; Liu, Meilin\*, and Wilson, Lane. “New insights into sulfur poisoning behavior of Ni-YSZ anode from long-term operation of anode-supported SOFCs,” *Energy & Environmental Science*, (2010), 3, 1804-1809.

16. Yang, Lei; Wang, Shizhong; Blinn, Kevin; Liu, Mingfei; Liu, Ze; **Cheng, Zhe**; Liu, Meilin\*. "Enhanced sulfur and coking tolerance of a mixed ion conductor for SOFCs:  $\text{BaZr}_{0.1}\text{Ce}_{0.7}\text{Y}_{0.2-x}\text{Yb}_x\text{O}_{3-\delta}$ ," *Science* (2009), 326(5949), 126-129. (*American Ceramic Society Ross Coffin Purdy Award*)
17. Yang, Lei; Zuo, Chendong; Wang, Shizhong; **Cheng, Zhe**; Liu, Meilin\*. "A novel composite cathode for low-temperature SOFCs based on oxide proton conductors," *Advanced Materials* (2008), 20(17), 3280-3283.
18. Abernathy, Harry W; Koep, Eric; Compson, Charles; **Cheng, Zhe**; Liu, Meilin\*. "Monitoring Ag-Cr interactions in SOFC cathodes using Raman spectroscopy," *Journal of Physical Chemistry C* (2008), 112(34), 13299-13303.
19. Choi, Songho; Wang, Jeng-Han; **Cheng, Zhe**; Liu, Meilin\*. "Surface modification of Ni-YSZ using niobium oxide for sulfur-tolerant anodes in solid oxide fuel cells," *Journal of the Electrochemical Society* (2008), 155(5), B449-B454.
20. **Cheng, Zhe**; Abernathy, Harry; Liu, Meilin\*. "Raman Spectroscopy of Nickel Sulfide  $\text{Ni}_3\text{S}_2$ ," *Journal of Physical Chemistry C* (2007), 111(49), 17997-18000.
21. Wang, Jeng-Han; **Cheng, Zhe**; Bredas, Jean-Luc; Liu, Meilin\*. "Electronic and vibrational properties of nickel sulfides from first principles," *Journal of Chemical Physics* (2007), 127(21), 214705/1-214705/8.
22. **Cheng, Zhe**; Zha, Shaowu; Liu, Meilin\*. "Influence of Cell Voltage and Current on Sulfur Poisoning Behavior of Solid Oxide Fuel Cells," *Journal of Power Sources* (2007), 172, 688.
23. Zha, Shaowu; **Cheng, Zhe**; Liu, Meilin\*. "Sulfur poisoning and regeneration of Ni-based anodes in solid oxide fuel cells," *Journal of the Electrochemical Society* (2007), 154, B201.
24. **Cheng, Zhe**; Liu, Meilin\*. "Characterization of sulfur poisoning of Ni-YSZ anodes for solid oxide fuel cells using *in situ* Raman microspectroscopy," *Solid State Ionics* (2007), 178, 925.
25. Wu, Qi-Hui; Abernathy, Harry; **Cheng, Zhe**; Liu, Meilin\*. "FTIR study of the oxygen reduction reactions," *Surface Review and Letters* (2007), 14(4), 587-591.
26. **Cheng, Zhe**; Zha, Shaowu; Liu, Meilin\*. "Stability of materials as candidates for sulfur-resistant anodes of solid oxide fuel cells," *Journal of the Electrochemical Society* (2006), 153, A1302.
27. Dong, Jian; **Cheng, Zhe**; Zha, Shaowu; Liu, Meilin\*. "Identification of nickel sulfides on Ni-YSZ cermet exposed to  $\text{H}_2$  fuel containing  $\text{H}_2\text{S}$  using Raman spectroscopy," *Journal of Power Sources* (2006), 156, 461.
28. **Cheng, Zhe**; Zha, Shaowu; Aguilar, Luis; Wang, Dean; Winnick, Jack; Liu, Meilin\*. "A Solid Oxide Fuel Cell Running on  $\text{H}_2\text{S}/\text{CH}_4$  Fuel Mixtures," *Electrochemical and Solid-State Letters* (2006), 9, A31.
29. **Cheng, Zhe**; Zha, Shaowu; Aguilar, Luis; Liu, Meilin\*. "Chemical, electrical, and thermal properties of strontium doped lanthanum vanadate," *Solid State Ionics* (2005), 176, 1921.
30. Zha, Shaowu; **Cheng, Zhe**; Liu, Meilin\*. "A sulfur-tolerant anode material for SOFCs -  $\text{Gd}_2\text{Ti}_{1.4}\text{Mo}_{0.6}\text{O}_7$ ," *Electrochemical and Solid-State Letters* (2005), 8, A406.
31. Zha, Shaowu; Tsang, Philip; **Cheng, Zhe**; Liu, Meilin\*. "Electrical properties and sulfur tolerance of  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{1-x}\text{Mn}_x\text{O}_3$  under anodic conditions," *Journal of Solid State Chemistry* (2005), 178(6), 1844-1850.
32. Aguilar, Luis; Zha, Shaowu; **Cheng, Zhe**; Winnick, Jack; Liu, Meilin\*. "A solid oxide fuel cell operating on hydrogen sulfide ( $\text{H}_2\text{S}$ ) and sulfur-containing fuels," *Journal of Power Sources* (2004), 135(1-2), 17-24.
33. Tang, Zilong\*; Zhang, Junying; **Cheng, Zhe**; Zhang, Zhongtai. "Synthesis of nanosized rutile  $\text{TiO}_2$  powder at low temperature," *Materials Chemistry and Physics* (2002), 77, 314.

**Proceedings/Peer-reviewed Conference Papers** (\* for corresponding author, underline for graduate/undergraduate student directly supervised by Zhe Cheng)

1. Awadallah, Osama; Hernandez, Joseph; Durygin, Andriy; **Cheng, Zhe\***. "In Situ Raman Monitoring of Kesterite  $\text{Cu}_2\text{ZnSnS}_4$  Phase Formation from Sulfurization of Sol-gel Oxide Precursors," *Photovoltaics Specialist Conference (PVSC)*, 2017 IEEE 44<sup>th</sup>, in production.
2. Awadallah, Osama; **Cheng, Zhe\***. "In situ Raman Characterization of  $\text{Cu}_2\text{ZnSnS}_4$  Solar Absorber Materials," *Photovoltaics Specialist Conference (PVSC)*, 2015 IEEE 42<sup>nd</sup>, 1-6. [DOI:10.1109/PVSC.2015.7355595](https://doi.org/10.1109/PVSC.2015.7355595)
3. Foroughi, Paniz; **Cheng, Zhe\***. "From Micron-sized Particles to Nanoparticles and Nanobelts: Structural Non-uniformity in the Synthesis of Boron Carbide by Carbothermal Reduction Reaction," *Advances in Ceramic Armor XI: A Collection of Papers Presented at the 39th International Conference on Advanced Ceramics and Composites* (ed J. C. LaSalvia), John Wiley & Sons, Inc., Hoboken, NJ, USA (2015), 51-62. [DOI:10.1002/9781119211549.ch5](https://doi.org/10.1002/9781119211549.ch5)
4. VahidMohammadi, Armin; **Cheng, Zhe\***. "Study on Sintering and Stability Issues of  $\text{BaZr}_{0.1}\text{Ce}_{0.7}\text{Y}_{0.1}\text{Yb}_{0.1}\text{O}_{3-\delta}$  Electrolyte for SOFCs," *Advances in Solid Oxide Fuel Cells and Electronic Ceramics: A Collection of Papers Presented at 39th International Conference on Advanced Ceramics and Composites* (eds N. P. Bansal, M. Kusnezoff and K. Shimamura), John Wiley & Sons, Inc., Hoboken, NJ, USA (2015) 21-29. [DOI:10.1002/9781119211501.ch3](https://doi.org/10.1002/9781119211501.ch3)
5. **Cheng, Zhe\***; Liu, Meilin\*, "Rational Design of Sulfur-Tolerant Anode Materials for Solid Oxide Fuel Cells," *ECS Transactions* (2013), 58(2), Electrochemical Synthesis of Fuels 2, 217-230. [DOI:10.1149/05802.0217ecst](https://doi.org/10.1149/05802.0217ecst)  
- Joined FIU in 08/2013 -
6. Zha, Shaowu; **Cheng, Zhe**; Liu, Meilin\*. "Gd<sub>2</sub>Ti<sub>2-x</sub>Mo<sub>x</sub>O<sub>7</sub>-based anode materials for H<sub>2</sub>S-air solid oxide fuel cells," *ECS Transactions* (2006), 1(7), Solid State Ionic Devices IV, 293-302.
7. **Cheng, Zhe**; Sacks, Michael D.\*; Wang, Chang-An.; Yang, Zhaohui. "Preparation of nanocrystalline silicon carbide powders by carbothermal reduction," *Ceramic Transactions* (2003), 154, 15.
8. **Cheng, Zhe**; Sacks, Michael D.\*; Wang, Chang-An. "Synthesis of nanocrystalline silicon carbide powders," *Ceramic Engineering and Science Proceedings* (2003), 24, 23-32.
9. Jain, Anubhav; Sacks, Michael D.\*; Wang, Chang-An; Middlemans, Michael; **Cheng, Zhe**. "Processing of nanocrystalline zirconium carbide powders." *Ceramic Engineering and Science Proceedings* (2003), 24, 41-49.
10. Wang, Chang-An; Sacks, Michael D.\*; Staab, Greg A.; **Cheng, Zhe**. "Solution-based processing of nanocrystalline SiC." *Ceramic Engineering and Science Proceedings* (2002), 23(4), 701-709.

**Chapters in Books**

- **Cheng, Zhe**; Wang, Jeng-Han; Liu, Meilin. "Chapter 2 - Anodes," in *Solid Oxide Fuel Cells: Materials Properties and Performance*, edited by Fergus, Jeffrey W.; Hui, Rob; Li, Xianguo; Wilkinson, David P.; Zhang, Jiujun. CRC Press, Taylor & Francis Group, Boca Raton, FL (2009), 73-129.

**Government Reports or Monographs**

N/A

**Book Reviews**

N/A

## OTHER PUBLICATIONS

N/A

## PRESENTED PAPERS, AND LECTURES

*Presentations* (\* for corresponding author, underline for postdoc/graduate/undergraduate student directly supervised by Zhe Cheng)

1. **Cheng, Zhe\***. “Novel High Temperature Carbide and Boride Ceramics for Direct Power Extraction Electrode Applications,” presented at *DOE NETL 2018 Annual Review Meeting for Crosscutting Research*, Pittsburg, Pennsylvania, 04/2018. (Oral)
2. Foroughi, Paniz; **Cheng, Zhe\***. “Phase Control during Synthesis of Nanocrystalline Ultrahigh Temperature  $Ta_xHf_{1-x}B_2$  Solution Powders,” presented at the *42<sup>nd</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2018. (Oral)
3. Xing, Junheng; **Cheng, Zhe\***. “Facile one-step high-temperature spray pyrolysis route toward ultrafine metal carbide nanocrystalline powders,” presented at the *42<sup>nd</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2018. (Oral)
4. Sun, Shichen; **Cheng, Zhe\***. “Evaluation of Cathode Materials for Proton Conducting Intermediate Temperature Solid Oxide Fuel Cells,” presented at the *42<sup>nd</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2018. (Oral)
5. Sun, Shichen; **Cheng, Zhe\***. “In-depth study of the poisoning effects for  $H_2S$  and  $CO_2$  on the Hydrogen Electrode for Proton Conducting SOFC,” presented at the *42<sup>nd</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2018. (Oral)
6. Awadallah, Osama; **Cheng, Zhe\*** “In Situ Raman Characterization of CZTS Phase Formation from Sulfurization of Sol-gel Oxide Precursors in ppm-level  $H_2S$ -Containing Atmosphere,” presented at the Materials Science & Technology 2017 (MS&T17), Pittsburg, Pennsylvania, 10/2017. (Poster)
7. **Cheng, Zhe\***; Xing, Junheng; Foroughi, Paniz; Behrens, Andres. “Synthesis of Nanocrystalline Ultrahigh Temperature Ceramic Powders via Rapid Single-step High Temperature Spray Pyrolysis,” presented at the Materials Science & Technology 2017 (MS&T17), Pittsburg, Pennsylvania, 10/2017. (Oral)
8. Foroughi, Paniz; **Cheng, Zhe\***. “Microstructure and Phase Control during Synthesis of Nanocrystalline Ultrahigh Temperature Tantalum Hafnium Diboride Powders ( $Ta_xHf_{1-x}B_2$ ) via Carbothermal/Borothermal Reduction Reaction,” presented at the Materials Science & Technology 2017 (MS&T17), Pittsburg, Pennsylvania, 10/2017. (Oral)
9. Foroughi, Paniz; Zhang, Cheng; Agarwal, Arvind; Cheng, **Zhe Cheng\***. “Understanding and Control of Phase Separation in Synthesis of Nanocrystalline  $Ta_xHf_{1-x}C$  Powders,” presented at the Materials Science & Technology 2017 (MS&T17), Pittsburg, Pennsylvania, 10/2017. (Oral)
10. Sun, Shichen; **Cheng, Zhe\***. “Understanding Anode and Cathode Reaction Mechanisms for Proton Conducting Intermediate Temperature Solid Oxide Fuel Cells,” presented at the 232<sup>nd</sup> Electrochemical Society Meeting, National Harbor, Maryland, 10/2017. (**Invited oral presentation**)
11. Awadallah, Osama; Hernandez, Joseph D; Durygin, Andriy; **Cheng, Zhe\***. “In Situ Raman Monitoring of Kesterite  $Cu_2ZnSnS_4$  Phase Formation from Sulfurization of Sol-gel Oxide

- Precursors,” presented at the 44<sup>th</sup> *IEEE Photovoltaics Specialist Conference (PVSC)*, Washington, DC, 06/2017. (Oral)
12. Sun, Shichen; **Cheng, Zhe\***. “Understanding the Cathode Reaction Process for Proton Conducting Intermediate Temperature Solid Oxide Fuel Cells Using Comparison Between BSCF and Other Cathode Materials,” presented at the 231<sup>st</sup> *Electrochemical Society Meeting*, New Orleans, Louisiana, 06/2017. (Oral)
  13. Sun, Shichen; **Cheng, Zhe\***. “Understand the Hydrogen Electrode Reaction for Proton Conducting SOFC via Controlled Poisoning Experiments Using Hydrogen Sulfide and Carbon Dioxide,” presented at the 231<sup>st</sup> *Electrochemical Society Meeting*, New Orleans, Louisiana, 06/2017. (Poster)
  14. Foroughi, Paniz; **Cheng, Zhe\***. “Synthesis, Characterization, and Sintering of Nanocrystalline Tantalum-Hafnium Carbide Solid Solution Powders,” presented at the 41<sup>th</sup> *International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2017. (Oral)
  15. Sun, Shichen; **Cheng, Zhe\***. “Understanding proton-conducting cathode for intermediate temperature proton-conducting SOFC,” presented at the 41<sup>th</sup> *International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2017. (Oral)
  16. Sun, Shichen; **Cheng, Zhe\***. “Understanding Poisoning of Proton Conducting SOFC Anode by Hydrogen Sulfide and Carbon Dioxide,” presented at the 41<sup>th</sup> *International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2017. (Oral)
  17. Awadallah, Osama; **Cheng, Zhe\***. “Preparation of Cu<sub>2</sub>ZnSnS<sub>4</sub> thin films using ppm-level Hydrogen Sulfide,” presented at the *Materials Science & Technology 2016 (MS&T16)*, Salt Lake City, Utah, 10/2016. (Oral)
  18. Awadallah, Osama; **Cheng, Zhe\***. “In-situ Raman Monitoring of Cu<sub>2</sub>ZnSnS<sub>4</sub> (CZTS) Solar Absorber Material at Elevated Temperatures,” presented at the *Materials Science & Technology 2016 (MS&T16)*, Salt Lake City, Utah, 10/2016. (Oral)
  19. Foroughi, Paniz; **Cheng, Zhe\***. “Understanding Size and Morphology Control of Boron Carbide Ceramic Powders Synthesized via Carbothermal Reduction Reaction,” presented at the *Materials Science & Technology 2016 (MS&T16)*, Salt Lake City, UT, 10/2016. (Oral)
  20. Foroughi, Paniz; **Cheng, Zhe\***. “Synthesis of Nanocrystalline Ultrahigh Temperature Tantalum Hafnium Carbide Solid Solution Powders and Related Nanocomposites,” presented at the *Materials Science & Technology 2016 (MS&T16)*, Salt Lake City, Utah, 10/2016. (Oral)
  21. Sun, Shichen; **Cheng, Zhe\***. “Poisoning of Proton Conducting SOFC By Hydrogen Sulfide and Carbon Dioxide Fuel Contaminants,” presented at the 229<sup>th</sup> *Electrochemical Society (ECS) Meeting*, San Diego, California, 06/2016. (Oral)
  22. Sun, Shichen; **Cheng, Zhe\***. “Ba<sub>0.5</sub>Sr<sub>0.5</sub>Co<sub>0.8</sub>Fe<sub>0.2</sub>O<sub>3</sub> Cathode for Intermediate Temperature Proton-Conducting Solid Oxide Fuel Cells,” presented at the 229<sup>th</sup> *Electrochemical Society (ECS) Meeting*, San Diego, California, 06/2016. (Oral)
  23. Awadallah, Osama; **Cheng, Zhe\***. “*In situ* Raman Monitoring of Cu<sub>2</sub>ZnSnS<sub>4</sub> Decomposition and Oxidation at Elevated Temperatures,” presented at the 2016 *Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, 03/2016. (Poster)
  24. Awadallah, Osama; **Cheng, Zhe\***. “Sol Gel Sulfurization of Cu<sub>2</sub>ZnSnS<sub>4</sub> Thin Films Using ppm Level Hydrogen Sulfide,” presented at the 2016 *Materials Research Society (MRS) Spring Meeting*, Phoenix, Arizona, 03/2016. (Poster)
  25. Sun, Shichen; **Cheng, Zhe\***. “Stability and Performance Issues of BSCF as Oxygen Electrode Material for Intermediate Temperature Proton-conducting SOFC/SOEC,” presented at the 40<sup>th</sup>

- International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2016. (Oral)
26. Foroughi, Paniz; **Cheng, Zhe\***. “Synthesis of Nanocrystalline Ultrahigh Temperature Tantalum Hafnium Carbide Solid Solution ( $Ta_xHf_{1-x}C_y$ ) Powders,” presented at the *40<sup>th</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2016. (Oral)
  27. Foroughi, Paniz; **Cheng, Zhe\***. “Understanding the Morphological Variation in the Formation of  $B_4C$  via Carbothermal Reduction Reaction,” presented at the *40<sup>th</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2016. (Oral)
  28. Awadallah, Osama; **Cheng, Zhe\***. “In situ Raman Characterization of  $Cu_2ZnSnS_4$  Solar Absorber Material,” presented at the *42<sup>nd</sup> IEEE Photovoltaics Specialist Conference (PVSC)*, New Orleans, Louisiana, 06/2015 (Oral)
  29. VahidMohammadi, Armin; **Cheng, Zhe\***. “Sinterability and Chemical Stability Issues of  $BaZr_{0.1}Ce_{0.7}Y_{0.1}Yb_{0.1}O_{3-\delta}$  Proton Conductive Electrolyte for SOFCs,” presented at the *227<sup>th</sup> Electrochemical Society Meeting*, Chicago, Illinois, 05/2015. (Oral)
  30. VahidMohammadi, Armin; **Cheng, Zhe\***. “Sintering Issues and Thermo-Chemical Stability of  $BZCYYb$  Proton Conductive Electrolyte for SOFCs,” presented at the *144<sup>th</sup> TMS Meeting*, Orlando, Florida, 03/2015. (Oral)
  31. VahidMohammadi, Armin; **Cheng, Zhe\***. “Sinterability and Chemical Stability Issues of  $BaZr_{0.1}Ce_{0.7}Y_{0.1}Yb_{0.1}O_{3-\delta}$  Proton Conductive Electrolyte for SOFCs,” presented at the *39<sup>th</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2015. (Oral)
  32. Foroughi, Paniz; **Cheng, Zhe\***. “Structural non-Uniformity and Reaction Mechanisms in the Synthesis of Boron Carbide,” presented at the *39<sup>th</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2015. (Oral)  
- Joined FIU in 08/2013 -
  33. **Cheng, Zhe**; Zha, Shaowu; Abernathy, Harry; Liu, Meilin. “Experimental investigation of the sulfur poisoning process for solid oxide fuel cell anodes,” presented at the *31<sup>st</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach, Florida, 01/2007. (Oral)
  34. **Cheng, Zhe**; Zha, Shaowu; Liu, Meilin. “Sulfur-anode interaction for solid oxide fuel cells,” presented at the *Workshop on Industry & University Cooperative Research Centers (I/UCRC) for Fuel Cells at University of South Carolina – Georgia Tech*, Atlanta, Georgia, 02/2007. (Poster)
  35. **Cheng, Zhe**; Zha, Shaowu; Choi, Yong Man; Choi, Songho; Liu, Meilin. “Sulfur-tolerant anodes for solid oxide fuel cells,” presented at the 1<sup>st</sup> meeting for the Strategic Energy Institute (SEI) at Georgia Institute of Technology, Atlanta, Georgia, 03/2006. (Poster)
  36. **Cheng, Zhe**; Zha, Shaowu; Liu, Meilin. “Stability of materials as candidate for sulfur-resistant anode of solid oxide fuel cells,” presented at the *Workshop on Electrochemistry, MEMS and Nanotechnology of the Georgia local section of the Electrochemical Society*, Atlanta, Georgia, 09/2005. (Oral)
  37. **Cheng, Zhe**; Sacks, Michael D.; Wang, Chang-An. “Processing of nanocrystalline SiC using solution-based precursors,” presented at the *27<sup>th</sup> International Conference & Exposition on Advanced Ceramics & Composites*, Cocoa Beach, Florida, 01/2003. (Oral)

## CREATIVE WORK

N/A

## WORKS IN PROGRESS

*Papers Submitted to Journals for Consideration* (\* for corresponding author, underline for postdoc/graduate/undergraduate student directly supervised by Zhe Cheng)

- N/A

*Papers to be Submitted* (\* for corresponding author, underline for postdoc/graduate/undergraduate student directly supervised by Zhe Cheng)

1. Awadallah, Osama; Durygin, Andriy; **Cheng, Zhe\***. “Unveiling the phase evolution of sol-gel sulfurized  $\text{Cu}_2\text{ZnSnS}_4$  thin films in ppm level  $\text{H}_2\text{S}$ : from binary sulfides to quaternary Cu-Zn-Sn-S system,” *under preparation* (2018).
2. Foroughi, Paniz; Durygin, Andriy; **Cheng, Zhe\***. “Synthesis and Flash Sintering of  $\text{Ta}_{0.5}\text{Hf}_{0.5}\text{B}_2$  Solid Solution Nanopowders,” *under preparation* (2018).
3. Xing, Junheng; Foroughi, Paniz; Rabiei Baboukani, Amin; Wang, Chunlei; **Cheng, Zhe\***. “Economical synthesis of high-entropy metal diboride ultra-high temperature ceramic nanopowders *under preparation* (2018).
4. Xing, Junheng; Foroughi, Paniz; Rabiei Baboukani, Amin; Wang, Chunlei; **Cheng, Zhe\***. “Facile economical routes toward novel nanocrystalline high-entropy metal nitride ultra-high temperature ceramic powders,” *under preparation* (2018).

## Pending Grant Proposals

2018

1. **Zhe Cheng (PI)**, “*CAREER: Fundamentals and New Materials for Hydrogen Electrode of Intermediate Temperature Proton Conducting Solid Oxide Fuel Cells*,” NSF, 2019-2024, \$571,834. (Pending)

## FUNDED RESEARCH

1. **Zhe Cheng (PI)**, “*Economic Fabrication of Nano-sized High Temperature and Ultrahigh Temperature Ceramic Solid Solution Materials*.” NSF (Award#1635957), 10/2016-09/2019, **\$300,000**.
2. **Zhe Cheng (PI)** and Arvind Agarwal (co-PI), “*Novel High Temperature Carbide and Boride Ceramics for Direct Power Extraction Electrode Applications*.” DOE (Grant #DE-FE0026325), 10/2015-09/2019, **\$249,970** (\$220,000 to ZC)
3. **Zhe Cheng (PI at FIU)** and Sung Jun Kim (PI at Univ of Miami), “*Advanced Integrated Solar Hydrogen Cell via Novel Nano Materials*.”, FIU-UM Nano Cross Research Exchange Forum (FIU-UM Nano-CREF), 09/2014-08/2015 \$50,000 (**\$25,000** to ZC at FIU)
4. **Zhe Cheng (PI)**, “*Environmental Friendly Processing of Low Cost Flexible Copper Zinc Tin Sulfide Solar Cells*.” NASA - Florida Space Research Program (NASA - FSRP), 08/2014-05/2016, **\$25,000**

## PROPOSALS SUBMITTED BUT NOT FUNDED

2018

1. **Zhe Cheng (PI)**, “*Novel Processing of Multi-Component High Temperature Ceramics*,” NASA - Florida Space Research Program (NASA - FSRP), 2018-2019, \$25,000 (Declined)



2. **Zhe Cheng (PI)**, Chunlei Wang (co-PI) “*Robust and High Performance Intermediate Temperature Proton Conducting Solid Oxide Fuel Cells*,” DOE, 2018-2020, \$625,000. (Declined)
3. **Zhe Cheng (PI)**, “*Manufacturing of Two-Dimensional High-temperature Ceramics with Economic and Scalable Salt-Template Method*,” NSF, 2018-2021, \$335,459. (Declined)

2017

1. **Zhe Cheng (PI)**, Chunlei Wang (co-PI) “*Renewable Power Generation from Intermediate Temperature Proton Conducting Solid Oxide Fuel Cells using Biogas*,” NSF, 2018-2021, \$421,442. (Declined)
2. Andriy Durygin (PI), **Zhe Cheng (co-PI)** “*Flash Sintering of Ceramic Laser Materials*,” NSF, 2018-2021, \$299,999. (Declined)
3. **Zhe Cheng (PI)**, “*Synthesis & Novel Processing of Nano High Entropy High Temperature & Ultra-high Temperature Ceramic Materials*.” Office of Naval Research (ONR), 2018-2021, \$660,000. (Declined)
4. **Zhe Cheng (PI)**, “*CAREER: Fundamentals and New Electrode Materials for Hydrogen Electrochemical Oxidation Reaction based on Proton Conducting Ceramic Electrolyte at Intermediate Temperatures*,” NSF, 2018-2023, \$576,685. (Declined)
5. **Zhe Cheng (PI)**, Chunlei Wang (co-PI), Tom Westrich (co-PI) “*Low Cost Modification of SOFC Electrodes for Improved Performance and Robustness*.” DOE, 2017-2019, \$300,000. (Declined)

2016

1. **Zhe Cheng (PI)**, “*Fundamentals and New Electrode Materials for Hydrogen Electrochemical Oxidation Reaction*.” NSF, 2017-2021, \$497,869. (Declined)
2. **Zhe Cheng (PI)**, Benjamin Boesl “*3D Printing of Nano Ultra-High Temperature Ceramic Powders for Aerospace Applications*.” NASA - Florida Space Research Program (NASA - FSRP), 08/2016-05/2017, \$25,000. (Declines)
3. **Zhe Cheng (PI)**, Yu Zhong (co-PI), Tom Westrich (co-PI), “*SOFCs Integrating Sulfur-Tolerant Reformer with Sulfur-Tolerant Anode for Direct Utilization of Practical Light Hydrocarbon Fuels*.” DOE, 2016-2018, \$500,000. (Declined)
4. **Zhe Cheng (PI)**, “*Understanding Fundamental Kinetics and Microstructural Evolution for Phase Transformation Confined within Nanoparticles of High Temperature Ceramic Solid Solution Materials*.” American Chemical Society – Petroleum Research Fund (ACS-PRF), 2017-2019, \$110,000. (Declined)
5. Yu Zhong (PI), **Zhe Cheng (co-PI)**, Shrikanth Gopalan (co-PI), Jian Luo (co-PI), “*DMREF: Collaborative Research: The Integrated Experimental and Computational Design for Novel Proton Conducting Oxides*.” NSF, 2016-2019, \$799,260. (Declined)

2015

1. **Zhe Cheng (PI)**, “*Understanding Kinetics and Mechanism for Fuel Electrode Reactions Involving Proton Conducting Ceramics*.” DOE, 2016-2021, \$750,000. (Declined)
2. **Zhe Cheng (PI)**, “*CAREER: Understanding Kinetics and Mechanism for Fuel Electrode Reactions Involving Proton Conducting Ceramics*.” NSF, 2016-2021, \$500,000. (Declined)
3. **Zhe Cheng (PI)**, “*Economic Fabrication of Nano-sized High Temperature and Ultrahigh Temperature Ceramic Solid Solution Materials*.” NSF, 2015-2018, \$298,395. (Declined)
4. Yu Zhong (PI), **Zhe Cheng (co-PI)**, “*DMREF: Collaborative Research: The Integrated Materials and Processes Design for Novel Proton Conducting Oxides*.” NSF, 2015-2018, \$729,093. (Declined)

2014

1. **Zhe Cheng (PI)**, “*Electrocatalysis Study on Proton Conducting Ceramics: Their Roles in the Electrochemical Oxidation of Chemical Fuels.*” NSF, 2015-2018, \$297,514. (Declined)
2. **Zhe Cheng (PI)**, “*Synthesis, Processing, and Fundamental Mechanism Study of Nano Boron-Containing Hard and Superhard Ceramic Materials.*” American Chemical Society – Petroleum Research Fund (ACS-PRF), 2015-2017, \$110,000. (Declined)
3. **Zhe Cheng (PI)**, “*Improving Durability and Robustness of Solid Oxide Fuel Cells by Developing New Low-Strontium Cathode Materials as Drop-in Replacement for the Incumbent Lanthanum Strontium Cobalt Iron Oxide Cathode.*” DOE, 2014-2016, \$421,480. (Declined)
4. Yu Zhong (PI), Shrikanth Gopalan (co-PI), **Zhe Cheng (co-PI)**, “*The Integrated Materials and Processes Design for Novel Proton Conducting Oxides.*” NSF, 2014-2017, \$583,029. (Declined)
5. **Zhe Cheng (co-PI)**, “*Center for the Study of Perovskites for Energy Applications (CeSPEA).*” DOE, 2015-2020, \$12,087,728. (Declined)
6. **Zhe Cheng (PI)**, “*Electrocatalysis Study on Proton Conducting Ceramics: Their Roles in the Electrochemical Oxidation of Chemical Fuels for Solid Oxide Fuel Cells.*” Office of Naval Research (ONR), 2014-2017, \$619,122. (Declined)

2013

1. **Zhe Cheng (PI)**, “*Proton Formation and Surface Water Adsorption on Catalytic Properties of Mesoporous Perovskite-Structured Oxides in Heterogeneous Catalytic Reactions.*” NSF, 2014-2017, \$221,000. (Declined)
2. **Zhe Cheng (PI)**, “*Micro- and Mesoporous Proton Conducting Oxides: Proton Formation and Transport on Catalytic Activity and Resistance to Carbon Deposition in Catalytic Reactions.*” American Chemical Society – Petroleum Research Fund (ACS-PRF), 2014-2016, \$110,000. (Declined)
3. **Zhe Cheng (PI)**, “*Electrocatalysis Study on Proton Conducting Ceramics: Their Roles in the Electrochemical Oxidation of Chemical Fuels.*” NSF, 2014-2017, \$394,337. (Declined)

#### PATENT DISCLOSURES, APPLICATIONS, AND AWARDS

1. **Cheng, Zhe; Foroughi, Paniz; Behrens, Andrés**, “Synthesis of high temperature ceramic powders,” US Patent 9,919,973 (2018).  
- Joining FIU in 08/2013 -
2. Yang, Lei; **Cheng, Zhe**; Liu, Ze; Liu, Meilin. “Chemical compositions, methods of making the chemical compositions, and structures made from the chemical compositions,” US Patent 8,932,781 (2015).
3. Cheng, Lap-tak; **Cheng, Zhe**; Lai, Cheng-yu; Lu, Meijun. “Etching composition,” US Pat. Appl. (2012), US20120180852.
4. Tang, Zilong; Zhang, Junying; Zhang, Zhongtai; **Cheng, Zhe**; Luo, Shaohua. “Manufacture of nanometered rutile titania at low temperatures,” CN Pat. Appl. (2002), CN1351962.

#### PROFESSIONAL HONORS, PRIZES, FELLOWSHIPS

##### *Department*

N/A

##### *School/College*

N/A

## **University**

N/A

## **External**

- Young Faculty Travel Award, The Electrochemical Society, 2013  
- Joining FIU in 08/2013 -
- Ross Coffin Purdy Award (co-recipient), The American Ceramic Society, 2010
- Best Oral Presentation Award, Georgia local section of the Electrochemical Society, 2005
- Outstanding M.S. Thesis Award, School of Materials Science & Engineering, Georgia Institute of Technology, 2005

## **Competitive Awards/Fellowships/Grants to Supervised Students**

- FIU College of Engineering & Computing Outstanding Doctoral Degree Award
  - Paniz Foroughi - 2018 summer
- FIU University Graduate School (UGS) Dissertation Year Fellowship (DYF, \$8300/semester; 2 semesters continuous)
  - Shichen Sun - 2018 summer and fall
  - Paniz Foroughi - 2018 spring and summer
  - Osama Awadallah - 2018 spring and summer
- FIU University Graduate School (UGS) Doctoral Evidence Acquisition (DEA) Fellowship (\$8300/semester; 1 semester only)
  - Osama Awadallah - 2017 spring and summer
  - Paniz Foroughi - 2017 spring

## **LIST OF COURSES TAUGHT**

### ***Courses Taught - List by Course Number***

1. *EGN3365*                      *Materials Engineering (ME undergraduate required)*
  - 2014 fall (37 enrolled, ~95% Excellent/Very good)
  - 2015 spring (37 enrolled, ~83% Excellent/Very good)
  - 2015 summer (41 enrolled, ~94% Excellent/Very good)
  - 2015 fall (41 enrolled, ~76% Excellent/Very good)
  - 2016 spring (37 enrolled, ~100% Excellent/Very good)
  - 2016 fall (49 enrolled, ~87% Excellent/Very good)
  - 2017 spring (47 enrolled, ~88% Excellent/Very good)
  - 2017 fall (56 enrolled, ~77% Excellent/Very good)
2. *EMA3702*                      *Mechanics of Materials (ME undergraduate required)*
  - 2016 summer (34 enrolled, ~74% Excellent/Very good)
  - 2017 summer (29 enrolled, ~88% Excellent/Very good)
  - 2018 spring (100 enrolled, ~81% Excellent/Very good)
  - 2018 summer (41 enrolled, ~89% Excellent/Very good)
3. *EMA4303/5305*              *Electrochemical Engineering (MSE graduate & ME undergraduate elective)*
  - 2017 fall
4. *EMA5001*                      *Physical Properties of Materials (MSE graduate core course)*

- 2014 spring (16 enrolled, ~84% Excellent/Very good)
  - 2015 spring (3 enrolled)
  - 2016 spring (9 enrolled, ~78% Excellent/Very good)
  - 2017 spring (5 enrolled)
  - 2018 spring (6 enrolled, ~50% Excellent/Very good)
5. *EMA5646 Ceramic Processing* (MSE graduate elective)
- 2015 fall (10 enrolled, ~80% Excellent/Very good)
6. Others
- EML4905 Senior Design (2014 spring, 2014 fall, 2015 fall, 2016 spring)
  - EML6908 Independent Study (2014-2018)
  - EML6910 Supervised Research (2014-2018)
  - EML7979 Ph.D. Dissertation (2015-2018)

### ***Courses Taught - List by Semester***

1. 2014 spring
  - *EMA5001 Physical Properties of Materials* (16 enrolled, ~84% Excellent/Very good)
2. 2014 fall
  - *EGN3365 Materials Engineering* (37 enrolled, ~95% Excellent/Very good)
3. 2015 spring
  - *EGN3365 Materials Engineering* (37 enrolled, ~83% Excellent/Very good)
  - *EMA5001 Physical Properties of Materials* (3 enrolled)
4. 2015 summer
  - *EGN3365 Materials Engineering* (41 enrolled, ~94% Excellent/Very good)
5. 2015 fall
  - *EGN3365 Materials Engineering* (41 enrolled, ~76% Excellent/Very good)
  - *EMA5646 Ceramic Processing* (10 enrolled, ~80% Excellent/Very good)
6. 2016 spring
  - *EGN3365 Materials Engineering* (37 enrolled, ~100% Excellent/Very good)
  - *EMA5001 Physical Properties of Materials* (9 enrolled, ~78% Excellent/Very good)
7. 2016 summer
  - *EMA3702 Mechanics of Materials* (34 enrolled, ~74% Excellent/Very good)
8. 2016 fall
  - *EGN3365 Materials Engineering* (49 enrolled, ~87% Excellent/Very good)
9. 2017 spring
  - *EGN3365 Materials Engineering* (47 enrolled, ~88% Excellent/Very good)
  - *EMA5001 Physical Properties of Materials* (5 enrolled)
10. 2017 summer
  - *EMA3702 Mechanics of Materials* (29 enrolled, ~88% Excellent/Very good)
11. 2017 fall
  - *EGN3365 Materials Engineering* (56 enrolled, ~77% Excellent/Very good)
  - *EMA4303/5305 Electrochemical Engineering* (6 enrolled)
12. 2018 spring
  - *EMA3702 Mechanics of Materials* (100 enrolled, ~80% Excellent/Very good)
  - *EMA5001 Physical Properties of Materials* (6 enrolled)
13. 2018 summer
  - *EMA3702 Mechanics of Materials* (41 enrolled, ~89% Excellent/Very good)

## ACADEMIC ADVISING

### *Postdoc Advisor*

- Dr. Junheng Xing (Ph.D. from South China University of Technology, 01/2017 to 09/2018)

### *Ph.D. Dissertation Advisor*

- **Paniz Foroughi**, Ph.D. in Materials Science & Engineering, 01/2013-07/2018
  - Thesis title: *Synthesis & Fundamental Formation Mechanism Study of High Temperature & Ultrahigh Temperature Ceramics*
  - **Graduated with PhD in summer 2018**
  - Publications:
    1. Foroughi, Paniz; Rabiei Baboukani, Amin; Hernandez, Alexander Franco; Wang, Chunlei; Cheng, Zhe\*. "Phase Control during Synthesis of Nanocrystalline Ultrahigh Temperature Tantalum-Hafnium Diboride Powders," *Journal of the American Ceramic Society* (2018). [DOI:10.1111/jace.15783](https://doi.org/10.1111/jace.15783)
    2. Xing, Junheng; Foroughi, Paniz; Hernandez, Alexander Franco; Behrens, Andrés; Cheng, Zhe\*. "Facile one-step high-temperature spray pyrolysis route toward metal carbide nanopowders," *Journal of the American Ceramic Society* (2018). [DOI:10.1111/jace.15785](https://doi.org/10.1111/jace.15785)
    3. Foroughi, Paniz; Cheng, Zhe\*. "Controlling phase separation of Ta<sub>x</sub>Hf<sub>1-x</sub>C solid solution nanopowders during carbothermal reduction synthesis," *Journal of the American Ceramic Society* (2017), 100 (11), 5056-5065. [DOI:10.1111/jace.15065](https://doi.org/10.1111/jace.15065)
    4. Cheng, Zhe\*; Foroughi, Paniz; Behrens, Andrés. "Synthesis of nanocrystalline TaC powders via single-step high temperature spray pyrolysis from solution precursors," *Ceramics International* (2017), 43(3), 3431-3434. [DOI:10.1016/j.ceramint.2016.11.177](https://doi.org/10.1016/j.ceramint.2016.11.177)
    5. Foroughi, Paniz; Cheng, Zhe\*. "Understanding the morphological variation in the formation of B<sub>4</sub>C via carbothermal reduction reaction," *Ceramics International* (2016), 42(14), 15189-15198. [DOI:10.1016/j.ceramint.2016.06.126](https://doi.org/10.1016/j.ceramint.2016.06.126)
    6. Foroughi, Paniz; Cheng, Zhe\*. "From Micron-sized Particles to Nanoparticles and Nanobelts: Structural Non-uniformity in the Synthesis of Boron Carbide by Carbothermal Reduction Reaction," *Advances in Ceramic Armor XI: A Collection of Papers Presented at the 39th International Conference on Advanced Ceramics and Composites* (ed J. C. LaSalvia), John Wiley & Sons, Inc., Hoboken, NJ, USA (2015), 51-62. [DOI:10.1002/9781119211549.ch5](https://doi.org/10.1002/9781119211549.ch5)
    7. Cheng, Zhe; Foroughi, Paniz; Behrens, Andrés. "Synthesis of high temperature ceramic powders," US Patent 9,919,973 (2018).
    8. Another 1<sup>st</sup> authored manuscript currently under preparation
- **Osama Awadallah**, Ph.D. in Materials Science & Engineering, 08/2013-07/2018
  - Thesis title: *Synthesis, Processing, and Fundamental Phase Formation Study of CZTS Films for Solar Cell Applications*
  - **Graduated with PhD in summer 2018**
  - Publications:

1. Awadallah, Osama; Cheng, Zhe\*. "Study of the fundamental phase formation mechanism of sol-gel sulfurized  $\text{Cu}_2\text{ZnSnS}_4$  thin films using in situ Raman spectroscopy," *Solar Energy Materials and Solar Cells* (2018), 176, 222-229. [DOI:10.1016/j.solmat.2017.11.038](https://doi.org/10.1016/j.solmat.2017.11.038)
  2. Awadallah, Osama; Cheng, Zhe\*. "Formation of sol-gel based  $\text{Cu}_2\text{ZnSnS}_4$  thin films using ppm-level hydrogen sulfide," *Thin Solid Films* (2017), 625 (1), 122-130. [DOI:10.1016/j.tsf.2017.01.054](https://doi.org/10.1016/j.tsf.2017.01.054)
  3. Awadallah, Osama; Cheng, Zhe\*. "In Situ Raman Monitoring of  $\text{Cu}_2\text{ZnSnS}_4$  Oxidation and Related Decomposition at Elevated Temperatures," *IEEE Journal of Photovoltaics* (2016), 6(3), 764-769. [DOI:10.1149/2.0021508jes](https://doi.org/10.1149/2.0021508jes)
  4. Awadallah, Osama; Hernandez, Joseph; Durygin, Andriy; Cheng, Zhe\*. "In Situ Raman Monitoring of Kesterite  $\text{Cu}_2\text{ZnSnS}_4$  Phase Formation from Sulfurization of Sol-gel Oxide Precursors," *Photovoltaics Specialist Conference (PVSC), 2017 IEEE 44<sup>th</sup>*, in production.
  5. Awadallah, Osama; Cheng, Zhe\*. "In situ Raman Characterization of  $\text{Cu}_2\text{ZnSnS}_4$  Solar Absorber Materials," *Photovoltaics Specialist Conference (PVSC), 2015 IEEE 42<sup>nd</sup>*, 1-6. [DOI:10.1109/PVSC.2015.7355595](https://doi.org/10.1109/PVSC.2015.7355595)
  6. Another 1<sup>st</sup> authored manuscript currently under preparation
- **Shichen Sun**, Ph.D. in Materials Science & Engineering, 01/2014-12/2018 (expected)
    - Thesis topic: *Fundamental Electrochemical Study for Proton Conducting Ceramics*
    - Publications:
      1. Sun, Shichen; Cheng, Zhe\*. "H<sub>2</sub>S poisoning of proton conducting solid oxide fuel cell and comparison with conventional oxide-ion conducting solid oxide fuel cell," *Journal of the Electrochemical Society* (2018), 165 (10), F836-F844. [DOI:10.1149/2.0841810jes](https://doi.org/10.1149/2.0841810jes)
      2. Sun, Shichen; Awadallah, Osama; Cheng, Zhe\*. "Poisoning of Nickel Based Anode for Proton Conducting Solid Oxide Fuel Cells by Hydrogen Sulfide, Carbon dioxide, and Moisture as Fuel Contaminants," *Journal of Power Sources* (2018), 378, 255-263. [DOI:10.1016/j.jpowsour.2017.12.056](https://doi.org/10.1016/j.jpowsour.2017.12.056)
      3. Sun, Shichen; Cheng, Zhe\*. "Electrochemical Behaviors for Ag, LSCF and BSCF as Oxygen Electrodes for Proton Conducting IT-SOFC," *Journal of the Electrochemical Society* (2017), 164(10), F3104-F3113. [DOI:10.1149/2.0121710jes](https://doi.org/10.1149/2.0121710jes)
      4. Sun, Shichen; Cheng, Zhe\*. "Effects of H<sub>2</sub>O and CO<sub>2</sub> on Electrochemical Behaviors of BSCF Cathode for Proton Conducting IT-SOFC," *Journal of the Electrochemical Society* (2017), 164(2), F81-F88. [DOI:10.1149/2.0611702jes](https://doi.org/10.1149/2.0611702jes)
      5. Another 1<sup>st</sup> authored manuscript currently under preparation

#### ***Ph.D. and M.S. Thesis Committee Member***

1. Liang Xue, Ph.D. (FIU, 2019 spring expected)
2. Archana Loganathan, Ph.D. (FIU, 2018 fall expected)
3. Maria Teresa Mora, Ph.D. (FIU, 2018 fall expected)
4. Shadi Darvish, Ph.D. (FIU, 2018 spring)
5. Amir Chamaani, Ph.D. (FIU, 2017 fall)
6. Alexandra Joy Henriques, M.S. (FIU, 2017 summer)
7. Cheng Zhang, Ph.D. (FIU, 2016 fall)

8. Christopher Rudolf, Ph.D. (FIU, 2016 summer)
9. Mohammed Alrudayni, M.S. (FIU, 2015 fall)
10. Faris Alkordy, M.S. (FIU, 2015 fall)

### ***Non-Thesis MS. Graduates***

- Andres Behrens, M.S., 2018 summer
  - Publications
    1. Xing, Junheng; Foroughi, Paniz; Hernandez, Alexander Franco; Behrens, Andrés; Cheng, Zhe\*. “Facile one-step high-temperature spray pyrolysis route toward metal carbide nanopowders,” *Journal of the American Ceramic Society* (2018). [DOI:10.1111/jace.15785](https://doi.org/10.1111/jace.15785)
    2. Cheng, Zhe\*; Foroughi, Paniz; Behrens, Andrés. “Synthesis of nanocrystalline TaC powders via single-step high temperature spray pyrolysis from solution precursors,” *Ceramics International* (2017), 43(3), 3431-3434. [DOI:10.1016/j.ceramint.2016.11.177](https://doi.org/10.1016/j.ceramint.2016.11.177)
    3. Cheng, Zhe; Foroughi, Paniz; Behrens, Andrés. “Synthesis of high temperature ceramic powders,” US Patent 9,919,973 (2018).
    4. Another 3<sup>rd</sup> authored paper under preparation
- Armin Vahid Mohammadi, M.S., 2015 summer
  - Publications
    1. Vahid Mohammadi, Armin; Cheng, Zhe\*. “Fundamentals of Synthesis, Sintering, and Chemical Stability Issues of BaZr<sub>0.1</sub>Ce<sub>0.7</sub>Y<sub>0.1</sub>Yb<sub>0.1</sub>O<sub>3-δ</sub> Proton Conducting Electrolyte for SOFCs,” *Journal of Electrochemical Society*, (2015), 162 (8), F803-811. [DOI:10.1149/2.0021508jes](https://doi.org/10.1149/2.0021508jes)
    2. Vahid Mohammadi, Armin; Cheng, Zhe\*. “Study on Sintering and Stability Issues of BaZr<sub>0.1</sub>Ce<sub>0.7</sub>Y<sub>0.1</sub>Yb<sub>0.1</sub>O<sub>3-δ</sub> Electrolyte for SOFCs,” *Advances in Solid Oxide Fuel Cells and Electronic Ceramics: A Collection of Papers Presented at 39th International Conference on Advanced Ceramics and Composites* (eds N. P. Bansal, M. Kusnezoff and K. Shimamura), John Wiley & Sons, Inc., Hoboken, NJ, USA (2015) 21-29. [DOI:10.1002/9781119211501.ch3](https://doi.org/10.1002/9781119211501.ch3)

### ***Supervised M.S. Students for Independent Study or Supervised Research***

- Diana Chira, M.S. student, FIU Materials Science & Engineering, 2016 spring
- Aurelian Marius Onu, M.S. student, FIU Materials Science & Engineering, 2017 spring
- Jose Eduardo Fernandez Urdaneta, M. S. student, FIU Materials Science & Engineering, spring

### ***Mechanical Engineering (ME) Undergraduate Advisor***

- Florida International University Mechanical Engineering senior design advisor for a project on Spray Pyrolysis for Synthesis of Nano Ceramic Powders by the student group consisting of Juan Diego Estepa, Iti Mehta, and Laura Reyes (fall 2015 to spring 2016)
- Florida International University Mechanical Engineering senior design advisor for a project on Flash Sintering of Advanced Ceramics by the student group consisting of Alejandro Vera, Nikhil Mohip, and Seth Mongbeh (2015 spring to 2015 fall)
- McNair Fellowship program advisor for Eddie Martinez of Florida International University working on nano hafnium diboride (nano HfB<sub>2</sub>) synthesis in the summer of 2014

## **OFFICES HELD IN PROFESSIONAL SOCIETIES**

- Member-at-large of the Electrochemical Society (ECS) High Temperature Energy, Materials, & Processes (H-TEMP)

## **OTHER PROFESSIONAL ACTIVITIES AND PUBLIC SERVICE**

- Member of the American Ceramics Society (ACerS)
- Reviewer for the following journals
  - *Catalysis*
  - *Electrochemical Acta*
  - *Electrochemistry Communication*
  - *International Journal of Hydrogen Energy*
  - *International Journal of Materials Research*
  - *Journal of Power Sources*
  - *Journal of the American Ceramic Society*
  - *Journal of the Electrochemical Society*
  - *Materials Letters*
- Grant reviewer for the following funding agencies
  - NSF for programs of Ceramics (CER), Materials Engineering & Processing (MEP), Nanomanufacturing (NM), and Small Business Innovation Research (SBIR).
  - DOE for programs of SBIR
  - ARO for programs
- Guest speaker to introduce the topic of materials and chemical engineering for American Heritage School (AHS) high school student engineering club

## **UNIVERSITY SERVICE**

### ***Service to the Department***

- Graduate committee member and serve to evaluate Ph.D. applicants, 2014-2018
- Co-graduate program director (co-GPD) for the MME department, 2018 summer - present
- Contact person/coordinator for MME online course offerings, 2018 summer - present

### ***Service to the College***

N/A

### ***Service to the University***

- Judge for University Graduate School (UGS) graduate student poster competition 2018