

# Sheima J. Khatib

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Associate Professor  
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## Education

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- **Doctor of Philosophy**, Institute of Catalysis and Petrochemistry (Spanish National Research Council (CSIC)\*)/Autonomous University (UAM), Spain. 2007  
Thesis Title: Synthesis, characterization and catalytic activity of supported transition metal oxides (Mo, V, Cr) for the oxidative dehydrogenation (ODH) of propane  
Advisor: Prof. Miguel Ángel Bañares Gonzalez
- **Master of Science in Chemical Engineering**, University of Malaga, Spain. 2002  
Thesis Title: Photocycloaddition of Cyclic Dienes to the Phthalimide Anion  
Advisor: Prof. Rafael García Segura
- **Bachelor of Science in Chemical Engineering**, University of Malaga, Spain. 2001

\* Ranked No. 1 in the Spanish research rankings, and in the top 10 in Europe

## Appointments

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August 2022 -

**Associate Professor**  
Department of Chemical Engineering  
Virginia Tech, Blacksburg, VA, US

September 2021 – July 2022

**Associate Professor**  
Department of Chemical Engineering  
Texas Tech University, Lubbock, TX, US

Jan. 2015-September 2021

**Assistant Professor**  
Department of Chemical Engineering  
Texas Tech University, Lubbock, TX, USA

May 2010- June 2014

**Research Associate**  
Department of Chemical Engineering  
Virginia Tech, Blacksburg, VA, USA  
Advisor: Prof. Shigeo Ted Oyama

May 2008- March 2010

**Postdoctoral Researcher**  
Institute of Chemical Physics “Rocasolano”  
CSIC, Madrid, Spain  
Advisor: Prof. Jose Maria Guil

## Honors and Awards

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- Jerry S. Rawls Outstanding Undergraduate Educator Award, 2022 (*Texas Tech University-Whitacre College of Engineering*)
- TTU Teaching Academy Inductee, 2022 (*Texas Tech University*)
- Whitacre Research Award, 2020 (*Texas Tech University-Whitacre College of Engineering*)
- NSF-CAREER Award, 2019
- Apple Polishing award from Texas Tech's Mortar Board, in recognition for impact on member's undergraduate education, 2021
- Texas Tech Alumni Association Award, 2019
- Texas Tech TLPDC Spotlight Award for creatively enhancing student learning and engagement in the classroom, 2019, 2017
- Outstanding Poster Presentation Award at the Catalysis Gordon Conference, 2018
- AIChE Student Chapter Best Professor Award, 2018
- Mortar Board and Omicron Delta Kappa's Faculty Recognition Award, 2018 (*Texas Tech University*)
- George T. and Gladys Abell-Hanger Faculty Award, 2017 (*Texas Tech University-Whitacre College of Engineering*)
- AIChE Student Chapter Best Professor Award, 2017
- Department of Energy Visiting Faculty Program, 2017
- Department of Energy Visiting Faculty Program, 2016

## Society Memberships

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- The American Chemical Society (ACS)
- American Institute of Chemical Engineers (AIChE)
- Southwest Catalysis Society (SWCS)
- American Society for Engineering Education (ASEE)

## Sponsored Projects

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| Date      | Title of Current Grant   | Funding Agency              | PIs   |
|-----------|--|-----------------------------|---|
| 2021-2024 | Catalyst Design Strategies for Multifunctional Metal-Promoted Zeolites for Direct Valorization of Methane  | US DOE-BES                  | Khatib, PI  |
| 2021-2024 | Designing a Methane Dehydroaromatization (MDA) Process for Feedstock Flexibility and High-On-Stream Time via Dynamic Kinetic and Thermodynamic Control                                   | DOE-EERE AMO                | Khatib, PI (43%)<br>Chen, co-PI (19%)<br>Fushimi, co-PI (38%)<br>Hart, co-PI      |
| 2020-2025 | CAREER: Tailoring the Synergy between Catalyst Design and Reaction Engineering for Direct Conversion of Methane to Aromatics   | NSF                         | Khatib, PI  |
| 2020-2023 | Integrated Experimental and Theoretical Endeavor for Fundamental Understanding of Processes in Methane Dehydroaromatization  | NSF                         | Khatib, PI (50%)<br>Howe, co-PI (50%)   |
| 2018-2021 | Harnessing Metal-Carbon Interactions to Obtain Enhanced Yield in Aromatics and Improved Coking Resistance in Methane Aromatization   | US DOE-BES                  | Khatib, PI  |
| 2022-2025 | Develop Synergetic Novel Macrocyclic-based Sorbents with Thermal Destruction for Enhanced Per- and Polyfluoroalkyl Substances (PFAS) Removal in Groundwater and Drinking Water Treatment | Department of Defense SERDP | Shen, PI (25%)<br>Guelfo, co-PI (25%)<br>Howe, co-PI (25%)<br>Khatib, co-PI (25%) |

## Publications

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**h-index 15 with citations of 1018, August 2022, Researcher ID: P-6629-2016**

**Google Scholar link:** <https://scholar.google.com/citations?user=nKNyE24AAAAAJ&hl=en>

### **Peer-Reviewed Journal Articles (Total 24, \* corresponding author)**

24. U. Menon, M. Rahman, S.J. Khatib\*, A critical literature review of the advances in methane dehydroaromatization over multifunctional metal-promoted zeolite catalysts, *Applied Catalysis A: General*, **608**, 117870 (2020).
23. M. Rahman, A. Infantes-Molina, A. Hoffman, S. Bare, K. Emerson, S.J. Khatib\*, Effect of Si/Al ratio of ZSM-5 support on structure and activity of Mo species in methane dehydroaromatization, *Fuel*, **278**, 118290 (2020).
22. A. Sridhar, M. Rahman, A. Infantes-Molina, A., B.J. Wylie, C.G. Borcik, S.J. Khatib\*, Bimetallic Mo-Co/ZSM-5 and Mo-Ni/ZSM-5 catalysts for methane dehydroaromatization: a study of the effect of pretreatment and metal loadings on the catalytic behavior, *Applied Catalysis A: General*, **589**, 117247 (2020).
21. M. Rahman, A. Infantes-Molina, A. Boubnov, S.R. Bare, E. Stavitski, A. Sridhar, S.J. Khatib\*, Increasing the catalytic stability by optimizing the formation of zeolite-supported Mo carbide species ex situ for methane dehydroaromatization, *Journal of Catalysis*, **375**, 314-328 (2019). (*Editor highlight for 2020 May edition of Journal of Catalysis*)
20. D. Vovchok, J. Tata, I. Orozco, F. Zhang, R.M. Palomino, W. Xu, L. Harper, S.J. Khatib, J.A. Rodriguez, S.D. Senanayake, Location and chemical speciation of Cu in ZSM-5 during water-gas shift reaction, *Catalysis Today*, **323**, 216-224 (2019).
19. A. Sridhar, M. Rahman, S.J. Khatib\*, Enhancement of Mo/ZSM-5 catalysts in methane aromatization by addition of Fe promoters and by reduction/carburization pretreatment, *ChemCatChem*, **10** (12), 2571-2583 (2018). (*Cover feature*)
18. M. Rahman, A. Sridhar, S.J. Khatib\*, Impact of the presence of Mo carbide species prepared ex situ in Mo/HZSM-5 on the catalytic properties in methane aromatization, *Applied Catalysis A: General*, **558**, 67-80 (2018).
17. V. Sánchez-Gil, E. Noya, A. Sanz, S.J. Khatib, J.M. Guil, E. Lomba, R. Marguta, S. Valencia, Experimental and simulation studies of the stepped adsorption of toluene on pure-silica MEL zeolite, *Journal of Physical Chemistry:C*, **120**, 16, 8640-8652 (2016).
16. S.J. Khatib\*, S.T. Oyama\*, Direct oxidation of propylene to propylene oxide with molecular oxygen: a review, *Catalysis Reviews*, **57**, 3, 306-344 (2015).
15. A. Gallardo, J.M. Guil, E. Lomba, N.G. Almarza, S.J. Khatib, C. Cabrillo, A. Sanz, J. Pires, Adsorption of probe molecules in pillared interlayered clays: experiment and computer simulations, *Journal of Chemical Physics*, **140**, 22, 224701 (2014).
14. S.J. Khatib, S. Yun, S.T. Oyama, Sulfur resistance by phosphidation of Pd and Pd alloy membranes, *Journal of Membrane Science*, **455**, 283-293 (2014).
13. S.J. Khatib\*, S.T. Oyama, Silica membranes for hydrogen separation prepared by chemical vapor deposition (CVD), *Separation and Purification Technology*, **111**, 20-42 (2013).

12. Z. Wang, Z., L. E. K. Achenie, S.J. Khatib, S.T. Oyama, Mixed mechanism model for permeation of gases in hybrid inorganic-organic membranes, *Industrial and Engineering Chemistry Research*, **52**, 9, 3258-3265 (2013).
11. Z. Wang, Z., L.E.K. Achenie, S.J. Khatib, S.T. Oyama, Simulation study of permeation of CO<sub>2</sub> and CH<sub>4</sub> in hybrid inorganic-organic membrane, *Journal of Membrane Science*, **387-388**, 30-39 (2012).
10. Y. Gu, B. Vaezian, S.J. Khatib, S.T. Oyama, Z. Wang, L. Achenie, Hybrid H<sub>2</sub>-selective silica membranes prepared by chemical vapour deposition, *Separation Science and Technology*, **47**, 1698-1708 (2012).
9. S.J. Khatib, S.T. Oyama, K.R. de Souza, F.B. Noronha, Review of silica membranes for hydrogen separation prepared by chemical vapor deposition, *Membrane Science and Technology*, **14**, 25-60 (2011).
8. R. Marguta, S.J. Khatib, J.M. Guil, E. Lomba, E. G. Noya, J.A. Perdigón-Melón, S. Valencia, Molecular simulation and adsorption studies of n-hexane in ZSM-11 zeolites, *Microporous & Mesoporous Materials*, **142**, 258-267 (2011).
7. S.J. Khatib, J.L.G. Fierro, M.A. Bañares, Effect of phosphorous additive on the surface chromium oxide species on alumina for propane oxidation to propylene, *Topics in Catalysis*, **52**, 1459-1469 (2009).
6. L. Yuan, V.V. Guliants, M.A. Bañares, S.J. Khatib, Mesoporous niobium-based mixed metal oxides containing Mo, V and Te for propane oxidative dehydrogenation, *Topics in Catalysis*, **49**, 268-280 (2008).
5. S.J. Khatib, R. Guil-López, M.A. Peña, J.L.G. Fierro, M.A. Bañares, Alumina-supported V-Mo-O mixed oxide catalysts, the formation of phases involving aluminum: AlVMoO<sub>7</sub>, *Catalysis Today*, **118**, 353-359 (2006).
4. M.A. Garcia, M.L. Ruiz Gonzalez, A. Quesada, J.L. Costa-Kramer, J.F. Fernandez, S.J. Khatib, A. Wennberg, A.C. Caballero, M.S. Martin-Gonzalez, M. Villegas, F. Briones, J.M. Gonzalez-Calbet, A. Hernando, Interface double-exchange ferromagnetism in the Mn-Zn-O system: New class of biphasic magnetism, *Physical Review Letters*, **94** (21) Art. No. 217206, (2006).
3. J.F. Fernández, A.C. Caballero, M. Villegas, S.J. Khatib, M.A. Bañares, J.L.G. Fierro, E. Costa-Kramer, M.S. López-Once, F. Martin-González, A. Briones, M. Quesada, A. García, J.L. Hernando, Structure and magnetism in the Zn-Mn-O system: A candidate for room temperature ferromagnetic semiconductor, *Journal of the European Ceramic Society*, **26**, 3017-3025 (2006).
2. M.A. Bañares, S.J. Khatib, Structure-activity relationships in alumina-supported molybdena-vanadia catalysts for propane oxidative dehydrogenation, *Catalysis Today*, **96**, 251 (2004).
1. G. Mul, M.A. Bañares, G. Garcia Cortéz, B. van der Linden, S.J. Khatib, J.A. Moulijn, MultiTRACK and Operando Raman-GC study of oxidative dehydrogenation of propane over alumina-supported vanadium oxide catalyst, *Physical Chemistry Chemical Physics*, **5**, 4378 – 4383 (2003).

### **Peer-Reviewed Conference Publications**

5. Dynamic study of the evolution of metal species in ZSM-5 during activation and reaction in direct methane dehydroaromatization  
S.J. Khatib, E.N. Joy, M. Rahman, A. Sridhar, A. Braga, S. R. Bare, A. Hoffman,  
Conference proceeding will be available to the public at a later date:  
<https://nam.confex.com/nam/2022/speakerscorner.cgi?username=18586&EntryType=Person>  
**27NAM, 27<sup>th</sup> North American Catalysis Society Meeting**, New York, NY, USA, 2022
4. Dynamic study of the evolution of metal species in ZSM-5 during activation and reaction in direct methane dehydroaromatization  
S.J. Khatib, M. Rahman, K.L. Emerson, S. R. Bare, A. Hoffman, A. Sridhar  
Conference proceeding is published on Speaker's Corner and the link is currently only available to presenting authors and will be available to the public in July:  
<https://nam.confex.com/nam/2020icc/meetingapp.cgi/Paper/22164>  
**17<sup>th</sup> International Congress on Catalysis 2020 Vision**, San Diego, CA, USA, 2020 (*postponed*)
3. Student confidence and metacognitive reflection with correlations to exam performance in a FE review course in chemical engineering  
S.J. Khatib, R. Taraban, W.D. Lawson  
Conference proceeding will be available to the public at a later date at:  
<https://www.asee.org/search/proceedings#papers>  
**2020 ASEE Virtual Annual Conference Experience**, 2020
2. Changes in student confidence, strategies, and reflection in a FE review course in chemical engineering  
S.J. Khatib, R. Taraban, W.D. Lawson  
Conference proceeding will be available to the public at a later date at:  
<https://www.asee.org/search/proceedings#papers>  
**2020 ASEE Gulf-Southwest Annual Conference**, Albuquerque, NM, USA, 2020 (location changed to virtual)
1. Enhancing the catalytic properties of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex-situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
<https://nam.confex.com/nam/2019/meetingapp.cgi/Paper/19906>  
**NAM26, 2019 North American Catalysis Society Meeting**, Chicago, IL, USA, 2019

## Invited Presentations

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23. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
S.J. Khatib  
**UK Catalysis Hub Summer Conference**, Didcot, Oxfordshire, UK, 2022
22. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
S.J. Khatib  
**Chemical Engineering - Department Seminar**, University of Surrey, Guildford, UK, 2022
21. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
S.J. Khatib  
**Chemical Engineering - Department Seminar**, Virginia Tech, VA, USA, 2022
20. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
S.J. Khatib  
**Chemical and Biomolecular Engineering - Department Seminar**, University of South Carolina, SC, USA, 2022
19. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
S.J. Khatib  
**Chemical and Biomolecular Engineering - Department Seminar**, North Carolina State University, NC, USA, 2022
18. Catalyst design strategies for multifunctional metal-promoted zeolites in methane dehydroaromatization  
M. Rahman, A. Sridhar, A. Infantes-Molina, A.S. Hoffman, S.R. Bare, S.J. Khatib  
**2021 DOE Catalysis Science PI Meeting**, Virtual, 2021
17. Dynamic study of the evolution of metal species in ZSM-5 during activation and reaction in direct methane dehydroaromatization  
S.J. Khatib, M. Rahman, A. Sridhar, U. Menon, A. Infantes-Molina, A.S. Hoffman, S.R. Bare  
**2021 ACS Fall Meeting**, Atlanta, GA, USA, 2021
16. Enhancing the stability of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
**Chemical Engineering - Department Seminar**, University of New Mexico, NM, USA, 2021
15. Enhancing the stability of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
**Chemical Engineering - Department Seminar**, University of Arkansas, AR, USA, 2020
14. Enhancing the stability of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
**Catalysis Club of Philadelphia Spring Symposium**, Virtual Meeting, 2020

13. Enhancing the stability of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
**Chemical and Biomolecular Engineering - Department Seminar**, Ohio State University, OH, USA, 2020
12. Student confidence and metacognitive reflection with correlations to exam performance in a FE review course in chemical engineering  
S.J. Khatib, R. Taraban, W.D. Lawson  
**DBER (Discipline Based Education Research) Seminars**, Texas Tech University, Lubbock, TX, USA, 2020
11. Active learning fundamentals  
S.J. Khatib  
**STEP (STEM Teaching, Engagement and Pedagogy) Program Mini-Conference**, Texas Tech University, Lubbock, TX, USA, 2019
10. Strategies for enhancement of the catalytic performance of Mo-based catalysts in methane dehydroaromatization  
S.J. Khatib, M. Rahman, A. Sridhar, A. Infantes-Molina, A. Boubnov, S.S. Bare, E. Stavitski (Poster)  
**2019 Catalysis Science PI Meeting, Marriott Washingtonian**, Gaithersburg, MD, USA, 2019
9. Enhancing the catalytic properties of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib, M. Rahman, A. Sridhar  
**Southwest Catalysis Society Spring Symposium**, University of Houston, Houston, TX, USA, 2019
8. Catalytic dehydroaromatization of methane: strategies for improving active chemistry and sustaining selectivity to benzene  
S. J. Khatib, M. Rahman, A. Sridhar  
**Department of Chemistry Seminar**, Texas Tech University, Lubbock, TX, USA, 2019
7. Nuevas oportunidades para hacer investigación científica en Texas Tech University + Aromatización catalítica de metano: estrategias para mejorar el rendimiento a benceno y mantener la estabilidad catalítica  
S. J. Khatib, M. Rahman, A. Sridhar  
**Department of Inorganic Chemistry Seminar**, University of Malaga, Malaga, Spain, 2019
6. How to engage students by adapting skeleton notes for diagrammatic and equation rich disciplines  
S. J. Khatib  
**STEP Program Implementation Series**, Texas Tech University, Lubbock, TX, USA, 2018
5. Synthesis, characterization and the fundamental interrogation of novel catalytic materials for industrial and energy applications  
S. J. Khatib  
**TTUHSC School of Health Professions, ELS Doctoral Seminar**, TTU, Lubbock, TX, USA, 2018
4. Skeleton notes in STEM? Adapting a classic active learning strategy for engineering  
S. J. Khatib  
**STEP Program Implementation Series**, TTU, Lubbock, TX, USA, 2018



3. Catalytic aromatization of methane: Strategies for improving active chemistry, mitigation of coke formation and sustaining selectivity to benzene  
S.J. Khatib, M. Rahman, A. Sridhar, L. Harper, J. Tata  
**2017 ACS Fall Meeting**, Washington D.C., USA, 2017
2. Synthesis, characterization and the fundamental interrogation of novel catalytic materials for industrial and energy applications  
S. J. Khatib  
**DOE-Visiting Faculty Program**, Brookhaven National Lab, Upton, NY, USA, 2017.
1. Ultrathin Pd and Pd alloy membranes with phosphorus additive and enhanced sulfur resistance applied in membrane reactors for ethanol steam reforming  
S.J. Khatib, S. Yun, S. T. Oyama  
**247th ACS National Meeting & Exposition**, Dallas, TX, USA, 2014

### Conference Presentations (Total 46, \* presenter)

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46. Dynamic study of the evolution of metal species in ZSM-5 during activation and reaction in direct methane dehydroaromatization  
S.J. Khatib, E.N. Joy\*, M. Rahman, A. Sridhar, A. Braga, S. R. Bare, A. Hoffman,  
**27NAM, 27<sup>th</sup> North American Catalysis Society Meeting**, New York, NY, USA, 2022
45. Dynamic Study of the Evolution of Metal Species in ZSM-5 During Activation and Reaction in Direct Methane Dehydroaromatization  
E.N. Joy\*, A. Sridhar, M. Rahman, S.J. Khatib  
**2021 AIChE Annual Meeting**, Boston, MA, USA, 2021
44. Crystalline Mixed Metal Oxides for CO<sub>x</sub>-Free Hydrogen Production by Direct Catalytic Decomposition of Methane  
H.J.Harbin\*, J. Chenault, D. Casadonte, S.J. Khatib (Poster)  
**2021 AIChE Annual Meeting**, Boston, MA, USA, 2021
43. *In-situ / operando* XAS characterization of ZSM-5 supported Mo catalysts to identify the reaction pathway to the active species for methane dehydroaromatization (MDA)  
N. Patra\*, A.S. Hoffman, S.J. Khatib, M. Rahman, S.R. Bare  
**XAFS2021**, Virtual Meeting, 2021
42. Techno-economic analysis of direct methane aromatization for natural gas upgrading with mini-plant construction for remote deployment  
M. Sees\*, L. Ward, C.C. Chen, S.J. Khatib  
**Virtual AIChE Spring 2020 Meeting**, USA, 2020
41. Student confidence and metacognitive reflection with correlations to exam performance in a FE review course in chemical engineering  
S.J. Khatib\*, R. Taraban, W.D. Lawson  
**2020 ASEE Annual Conference and Exposition**, Montreal, Quebec, Canada, 2020 (moved to virtual meeting)
40. Changes in student confidence, strategies, and reflection in a FE review course in chemical engineering  
S.J. Khatib, R. Taraban\*, W.D. Lawson

- 2020 ASEE Gulf South-west Annual Conference**, Albuquerque, NM, USA, 2020 (moved to virtual)
39. Techno-economic analysis of direct methane aromatization for natural gas upgrading with mini-plant construction for remote deployment  
M. Sees\*, L. Ward, C.C. Chen, S.J. Khatib  
**2019 AIChE Annual Meeting**, Orlando, FL, USA, 2019
  38. Natural gas sweetening by membrane cascade using a standardized model  
L. Ward\*, M. Sees, S.J. Khatib, C.C. Chen (Poster)  
**2019 AIChE Annual Meeting**, Orlando, FL, USA, 2019
  37. Enhancing the catalytic properties of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex-situ formation of metal carbides  
S.J. Khatib\*, M. Rahman, A. Sridhar  
**NAM26, 2019 North American Catalysis Society Meeting**, Chicago, IL, USA, 2019
  36. Catalytic dehydroaromatization of methane: strategies for enhancing the yield to aromatics and improving coking resistance  
S.J. Khatib\*, A. Sridhar, M. Rahman,  
**12th Natural Gas Conversion Symposium**, San Antonio, TX, USA, 2019
  35. Enhancement of catalytic properties of Mo/ZSM-5 catalysts for methane dehydroaromatization by ex situ formation of metal carbides  
S.J. Khatib\*, M. Rahman, A. Sridhar  
**2019 ACS Spring Meeting**, Orlando, FL, USA, 2019
  34. Catalytic aromatization of methane: strategies for improving active chemistry and sustaining selectivity to benzene  
S.J. Khatib\*, M. Rahman, A. Sridhar  
**2018 AIChE Annual Meeting**, Pittsburg, PA, USA, 2018
  33. Enhancement of Mo/ZSM-5 catalysts in methane aromatization by addition of Fe promoters and reduction/carburization pretreatment  
A. Sridhar, M. Rahman S.J. Khatib\* (Poster)  
**2018 AIChE Annual Meeting**, Pittsburg, PA, USA, 2018
  32. Strategies for improving active chemistry, mitigation of coke formation, and sustaining selectivity to benzene in the catalytic aromatization of methane.  
M. Rahman, A. Sridhar, S.J. Khatib\* (Poster) (*received poster award*)  
**2018 Catalysis Gordon Conference**, New London, NH, USA, 2018
  31. Enhancement of Mo/ZSM-5 catalysts in methane aromatization by addition of Fe promoters and reduction/carburization pretreatment  
A. Sridhar\*, M. Rahman S.J. Khatib (Poster)  
**2018 Southwest Catalysts Society Spring Symposium**, Houston, TX, USA, 2018
  30. Strategies for improving active chemistry, mitigation of coke formation and sustaining selectivity to benzene in the catalytic aromatization of methane  
S.J. Khatib\*, M. Rahman, A. Sridhar, J. Tata, L. Harper, E. Osoro (Poster)  
**2017 AIChE Annual Meeting**, Minneapolis, MN, USA, 2017
  29. ZSM-5 Supported molybdenum carbide and oxide catalysts for methane dehydroaromatization: elucidation of active sites and deactivation pathways  
L. Harper\*, S.J. Khatib, S.D. Senanayake

- DOE-Visiting Faculty Program**, Brookhaven National Lab, Upton, NY, USA, 2017
28. Synthesis, activity, and characterization of copper loaded ZSM-5 catalysts for the water-gas shift reaction  
J. Tata\*, D. Vovchok, S.J. Khatib, S.D. Senanayake, J. Rodriguez  
**DOE-Visiting Faculty Program**, Brookhaven National Lab, Upton, NY, USA, 2017
27. STEM Teaching Engagement and Pedagogy (STEP) Program: implementation of evidence-based instructional practices  
S.J. Khatib\*, K.Griffith, S.Tapp (Poster)  
**ASEE Chemical Engineering Summer School**, Raleigh, NC, USA, 2017.
26. Synthesis and physico-chemical properties of ZSM5-supported molybdenum carbide catalysts  
M. Rahman\*, S.J. Khatib (Poster)  
**Southwest Catalysis Society Spring Symposium**, Houston, TX, USA, 2017
25. Promotional effects of Fe on Mo-HZSM-5 in non-oxidative methane aromatization  
A. Sridhar\*, S.J. Khatib (Poster)  
**Southwest Catalysis Society Spring Symposium**, Houston, TX, USA, 2017
24. Synthesis, characterization and the fundamental interrogation of novel catalytic materials for industrial and energy applications  
S. J. Khatib, M. Rahman, A. Sridhar, T. Harvey\* (Poster)  
**DOE-Visiting Faculty Program**, Brookhaven National Lab, Upton, NY, USA, 2016
23. Ultrathin Pd and Pd alloy membranes with enhanced sulfur resistance using phosphorus additive and their application in membrane reactors for ethanol steam reforming  
S.J. Khatib\*, S. Yun. S. T. Oyama  
**2015 AIChE Annual Meeting**, Salt Lake City, UT, USA, 2015
22. Ultrathin Pd and Pd-Cu membranes prepared by electric field assisted activation and their application in membrane reactors for ethanol steam reforming  
S.J. Khatib\*, S. Yun. S. T. Oyama  
**11th Annual Symposium of the Southeastern Catalysis Society**, Asheville, NC, USA, 2012
21. Differences in hydrocarbon adsorption on PILCs of similar Zr (pillars) composition  
J.M. Guil\*, S. J. Khatib, N.G. Almarza, A. Gallardo, J. Pires (Poster)  
**5th International FEZA conference**, Valencia, Spain, 2011
20. Diferencias en la adsorción de hidrocarburos en PILCs con similar composición de Zr (pilares)  
J.M. Guil\*, S. J. Khatib, N.G. Almarza, A. Gallardo, J. Pires (Poster)  
**XXXV RIA. Reunião Ibérica de Adsorção**, Lisbon, Portugal, 2010
19. Efectos estructurales de P en la estabilización de especies superficiales de óxido de cromo soportados en alúmina durante la deshidrogenación oxidativa de propano  
S. J. Khatib\*, M. A. Bañares  
**XXVI Bienal Meeting of the Royal Spanish Society of Chemistry**, Toledo, Spain, 2007
18. Mesoporous and nanostructured multicomponent Mo-V-Te-Nb-O catalysts for propane ammoxidation to acrylonitrile  
V. V. Guliants, L.Y., L. Song, P. A. Korovchenko, M. A. Bañares, S. J. Khatib  
**AIChE Annual Meeting**, San Francisco, USA, 2006
17. Study of propane and propene Interactions with K- promoted vanadia alumina catalysts by TAP and Operando Raman spectroscopy  
G. Mul, B. Van der Linden, J.A. Moulijn, G.G. Cortez, S.J. Khatib, M.A. Bañares

- Operando-II Second International Congress on Operando Spectroscopy**, Toledo, Spain, 2006
16. Structural effects of P on the stabilization of surface Cr oxide species on alumina during propane oxidative dehydrogenation  
S.J. Khatib\*, M.A. Bañares  
**Operando-II Second International Congress on Operando Spectroscopy**, Toledo, Spain, 2006
15. Nature of the catalyst, of the carbonaceous species and of the active oxygen species on supported oxide catalysts during alkane oxidative and non-oxidative dehydrogenation  
M.A. Bañares\*, G. Garcia-Cortez, M.O. Guerrero-Pérez, S.J. Khatib, R. Guil-López, B.M. Weckhuysen, D. Keller and S. Tinnemans, O. Krause, S. Airaksinen, J. Kanervo, R. Puurunen, S. Korhonen, J.A. Moulijn, G. Mul, B. van der Linden, Wie Wie, R. Schoonheydt, Marijke Grootheart  
**COST D15 “Interfacial Chemistry and Catalysis” Final Workshop**, Maribor, Slovenia, 2005
14. MultiTRACK and Operando studies of oxidative and non-oxidative dehydrogenation of propane over supported oxide catalysts  
M.A. Bañares\*, G. Garcia-Cortez, M.O. Guerrero-Pérez, S.J. Khatib, R. Guil-López, B.M. Weckhuysen, D. Keller and S. Tinnemans, O. Krause, S. Airaksinen, J. Kanervo, R. Puurunen, S. Korhonen, J.A. Moulijn, G. Mul, B. van der Linden, Wie Wie, R. Schoonheydt, Marijke Grootheart  
**COST D15 “Interfacial Chemistry and Catalysis” Final Workshop**, Maribor, Slovenia, 2005
13. Nature and reactivity in methanol temperature-programmed surface reaction (TPSR) of supported mixed V-Mo oxide catalysts  
M.A. Bañares\*, G. Garcia-Cortez, M.O. Guerrero-Pérez, S.J. Khatib, R. Guil-López, B.M. Weckhuysen, D. Keller and S. Tinnemans, O. Krause, S. Airaksinen, J. Kanervo, R. Puurunen, S. Korhonen, J.A. Moulijn, G. Mul, B. van der Linden, Wie Wie, R. Schoonheydt, Marijke Grootheart.  
**COST D15 “Interfacial Chemistry and Catalysis” Final Workshop**, Maribor, Slovenia, 2005
12. Semiconductores magnéticos a temperatura ambiente basados en ZnO  
J. F. Fernández, A.C. Caballero, M. Villegas, E. López-Ponce, J. L. Costa-Kramer, F. Briones, S. J. Khatib, M.A. Bañares, J. L. García-Fierro, M. García, A. Quesada, A. Hernando  
**Electrocerámica 2005, VII National Meeting**, Teruel, Spain, 2005
11. Catalizadores de óxidos mixtos de V-Mo soportados: caracterización y reactividad en TPSR de metanol  
R. Guil-López, S.J. Khatib\*, M.A. Peña, M.A. Bañares  
**Meeting of the Spanish Catalysis Society, SECAT05**, Móstoles, Madrid, Spain, 2005.
10. Estudio de los centros superficiales ácidos, básicos y redox por reacción a temperatura programada (TPSR) de la molécula sonda metanol en catalizadores basados en  $\text{VO}_x/\text{Al}_2\text{O}_3$   
M. A. Bañares\*, G. G. Cortez, S. J. Khatib, R. Guil-López  
**XXIX Renião Ibérica de Adsorçao**, Oporto, Portugal
9. Propane (O)DH over K-promoted V/ $\text{Al}_2\text{O}_3$  catalysts: the analysis of carbonaceous deposits using Multi-track and Operando Raman  
M.A. Bañares\*, S. J. Khatib  
**13th International Congress on Catalysis**, Paris, France, 2004
8. La metodología Operando Raman en el estudio de la relación estructura-actividad de catalizadores de oxidación  
M. A. Bañares\*, M.O. Guerrero-Pérez, S. J. Khatib  
**XIX Simposio Iberoamericano de Catálisis**. Mérida, Yucatán, Mexico, 2004

7. MultiTRACK and Operando Raman-GC study of oxidative dehydrogenation of propane over alumina-supported vanadium oxide catalysts  
G. Mul, M.A. Bañares\*, G. Garcia Cortez, B. van der Linden, S. J. Khatib, J.A. Moulijn (Poster)  
**COST D15 “Interfacial Chemistry and Catalysis” 4th Workshop of all Working groups and 10th MC Meeting**, La Colle sur Loup, France, 20-23, October 2004
6. Role of additives on the structure and surface properties and reactivity for propane oxidation of alumina-supported vanadia  
M. A. Bañares, S. J. Khatib\*, R. Guil-López (Poster)  
**COST D15 “Interfacial Chemistry and Catalysis” 4th Workshop of all Working groups and 10th MC Meeting**, La Colle sur Loup, France, 20-23, October 2004
5. Catalysis by metal oxides: comparison between bulk mixed oxides, supported oxides, oxide clusters, organometallic oxides and oxide single crystals  
G. Mul, S. J. Khatib, B. van der Linden, M. A. Bañares, J. A. Moulijn  
**228th ACS National Meeting**, Philadelphia, USA, 22-26, August, 2004
4. Supported mixed V-Mo oxide catalysts for propane oxidation reactions  
M. A. Bañares\*, S. J. Khatib, R. Guil  
**228th ACS National Meeting**, Philadelphia, USA, 22-26 August, 2004
3. Highly reactive oxygen species on vanadia alumina catalysts as determined by Multi-Track: Relevance for steady state activity and role of Fe-contamination in alumina  
G. Mul, S. J. Khatib, B. van der Linden, M. A. Bañares, J. A. Moulijn  
**228th ACS National Meeting**, Philadelphia, USA, 22-26 August, 2004
2. Structure-activity relationships in alumina-supported transition metal oxides  
S. J. Khatib, M. A. Bañares\*  
**226th ACS National Meeting**, New York, USA, September 7-11, 2003
1. Estudio de la relación estructura-actividad en catalizadores soportados en alúmina de óxidos de elementos de transición  
S.J. Khatib\*, M.A. Bañares (Poster)  
**Meeting of the Spanish Catalysis Society, SECAT03**, Malaga, Spain, June 22-26, 2003

## Teaching

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|                             |   |
|-----------------------------|---|
| Fall 2015-2021              | <b>Chemical Engineering Review</b> (ChE 4322, Undergraduate)<br>Review of chemical engineering and science courses. Preparation for Chemical Engineering FE exam. Design and computer simulation of process units. (In Fall 2015, this course taught as ChE 4122.)  |
| Spring 2018, 2019, 2021     | <b>Reaction Kinetics</b> (ChE 5343, Graduate)<br>Analysis and design of chemical reactor operations with multiple reactions, semibatch operations and other complex reactor configurations. Determination of kinetic parameters from operating data. Economic-based optimization, characterization, and modeling of non-ideal reactors. |
| Spring 2015-2017, 2020-2021 | <b>Mass Transfer Operations</b> (ChE 3341, Undergraduate)<br>Theory and practice of mass transfer. Particular emphasis on the operations of distillation, absorption, and extraction.   |
| Fall 2015, Spring 2016      | <b>Research Seminar</b> (ChE 4121, Undergraduate)<br>Discussion of work presented at department seminars by external speakers focusing on their current research in chemical engineering and related fields.  |

## Student Supervision

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### **Graduate Students Completed (5):**

- Mustafizur Rahman; PhD 2019, “Dehydroaromatization of Methane over ZSM-5 Supported Molybdenum Carbide Catalysts”
- Apoorva Sridhar; PhD 2019, “The Influence of Pretreatment and Doping of Fe, Co and Ni on Mo/HZSM-5 Catalysts in Methane Dehydroaromatization”
- Teja Adepu; MS 2017, “Kinetic Regime Determination and Metal loading effects in Methane Aromatization”
- Farah Jacob; MS (non-thesis), 2016 “Studying Effects of Si/Al Ratio and Varying Si Sources on Crystal Size of ZSM-5”
- Saadan Ahmad; MS (non-thesis), 2022 “Bimetallic Mo-Fe catalysts for Methane Dehydroaromatization”

### **Other Graduate Students Supervised (8):**

- Fariha Afnan; 2021-2022 (PhD expected)
- Md Sifat Hossain; 2021-2026 (PhD expected)
- Emanuele Noel Joy; 2020-2025 (PhD expected)
- George Hana; 2020-2025 (PhD expected)
- Robin Dupre; MS 2020 (non-thesis, *completed*), “Synthesis and Characterization of TiO<sub>2</sub>/Au Nanostructure for Photoelectrochemical Water Splitting” (Assigned as advisor after primary advisor left Texas Tech University.)
- Hannah Harbin; 2019-2023 (PhD expected)
- Kayla L. Emerson; 2019-2020 (changed advisor in February 2020 on Khatib’s request)

### ***Undergraduate Students (16):***

- Carlos E. Hernandez, 2021-present
- Andrew Gearin, 2021-present
- Syed Nouman Azhar, 2020-2021
- Misfer Alotaibi, 2019-2020
- Lauren Ward, 2018-2020
- Abdiel Elizondo, 2018
- Jose Aguilar, 2018
- Atif Rupani, 2018
- Loise Mokua, 2017
- Peter Watkins, 2017
- Eva Osoro, 2017
- Ravisha Jayamaha, 2017
- George Haleem Ashraf, 2017
- Leah Harper, 2017
- James Tata, 2017
- Richard (Tate) Harvey, 2016

### ***Visiting Scholars (2):***

- Valentina Peoza, Universidad de Concepcion, 2018
- Matheus Pires Martins, Fluminense Federal University, 2017

### ***Postdoctoral Scholars (4):***

- Gagandeep Singh Dhillon, 2021-2022
- Adriano Henrique Braga, 2021-2022
- Unmesh Menon, 2020-2021
- Mustafizur Rahman, 2020-2021

## **Student Awards**

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- Syed Nouman Azhar, 1<sup>st</sup> Place in the TTU Undergraduate Research Conference, 2021
- Leah Harper, DOE, summer internship in association with the Visiting Faculty Program, 2017
- James Tata, DOE, summer internship in association with the Visiting Faculty Program, 2017
- Richard (Tate) Harvey, DOE, summer internship in association with the Visiting Faculty Program, 2016

## **Thesis Committees Served On**

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### **Ph.D. (2):**

- Kanchan Dutta; PhD, McGill University, ChE, 2020 thesis examiner (Advisor: Prof. Jan Kopyscinski)
- Pedro Gonzalez; PhD, TTU, ChE, completed qualifying exam in 2018 (Advisor: Prof. Harvinder Gill)

### **Other Qualifying Exams (4):**

- Cesar Gomez-Avila, 2020
- Fatenmeh Molajafari, 2020
- Fouzia H. Nowrin, 2020
- Rasoul Rahimzadeh, 2020

### **As Dean's Representative (4):**

- Hossein Eslami; PhD 2020, TTU, Psychology
- Ying Liang; PhD 2019, TTU, Chemistry
- Patrick Larson; PhD 2019, TTU, Chemistry
- Suresh Mummadi; PhD 2017, TTU, Chemistry

## Service

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### Professional

|              |   |
|--------------|---|
| 2022-2023    | AIChE, Area 20A Programming Chair for Catalysis and Reaction Engineering Division   |
| 2020-ongoing | NSF, Grant Proposal Panelist for CBET Catalysis   |
| 2019-ongoing | AIChE, Diversity Task Force for Catalysis and Reaction Engineering Division (2022 Chair)  |
| 2019-ongoing | AIChE, Director (Board), Catalysis and Reaction Engineering Division  |
| 2017-2020    | AIChE, Director (Board), Fuels and Petrochemicals Division  |
| 2017-ongoing | Southwest Catalysis Society, Director (Board)   |
| 2017-ongoing | US Department of Energy – Basic Energy Sciences, Reviewer for Grant Proposals   |
| 2017-ongoing | ACS-PRF, Reviewer for Grant Proposals   |
| 2019-2020    | ICC (International Congress in Catalysis) Session Chair   |
| 2019         | NAM (North American Catalysis Society Meeting) Session Chair  |
| 2019         | AIChE, NGCS (Natural Gas Conversion Symposium) Session Chair  |
| 2019         | AIChE, Session Chair at Annual Meeting, Catalysis and Reaction Engineering Division   |
| 2016-ongoing | AIChE, Session Chair at Annual Meeting, Fuels and Petrochemicals Division   |
| 2018-ongoing | USDA-NIFA, Proposal Panelist  |
| 2016-2020    | Reviewer for following journals:<br>ACS Catalysis, ChemCatChem, Applied Catalysis B: Environmental, Angewandte Chemie, Nature Communications, Journal of Catalysis, Applied Catalysis A: General, Fuel, Topics in Catalysis, Chemical Physics Letters, Chemical Engineering Journal, Materials Chemistry and Physics, Industrial and Engineering Chemistry Research |

### University (at TTU)

|                |  |
|----------------|--|
| 2017 - 2020    | STEM CORE (STEM Center for Outreach, Research, and Education) Associate Director, chair of seminars committee (2017-2019)      |
| 2017 - Present | STEP (STEM Teaching, Engagement and Pedagogy) Program Specialist, mentor, representing college of engineering, seminar speaker |
| 2017 - 2019    | CISER (Center for the Integration of STEM Education & Research), Advisory Board  |

### Department (at TTU)

|              |   |
|--------------|---|
| 2017-Present | Undergraduate Committee   |
| 2020         | Faculty Search Committee, Recruitment Activity                      |
| 2019         | Faculty Search Committee for Machine Learning, Recruitment Activity |
| 2019         | Faculty Search Committee for Energy Storage, Recruitment Activity   |
| 2018- 2019   | Department Chair Search Committee                                   |
| 2015-Present | AIChE Annual Meeting ChE Department Reception Committee             |
| 2015-2017    | Department Safety Committee, Committee Member                       |
| 2015         | Faculty Search Committee for Energy, Recruitment Activity           |