Nimal Naser

CONTACT INFORMATION

Engine Research Center (ERC)
University of Wisconsin–Madison (UWM)
Madison, Wisconsin 53706-1609, U.S.A

+ 1 (608) 886 8788
✉ nimal.naser@gmail.com
✉ nimal.naser@wisc.edu

PROFILE

Highly self-motivated postdoctoral scholar with research background in internal combustion engines and fuel chemistry. A team player with excellent communication skills and academic standing. Rich experience in experimental techniques and scientific computing. Dedicated scholar with strong analytical, quantitative and problem solving skills. Resourceful and versatile with highly developed work ethic, and reputation for integrity.

EDUCATION

Doctor of Philosophy (Ph.D.), Mechanical Engineering (CGPA: 3.75/4.00) 2013 – 2018

King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

- Dissertation: *Autoignition behavior of practical fuels*
- Advisors: Suk Ho Chung, Ph.D. and S. Mani Sarathy, Ph.D.

Master of Technology (M.Tech.), Mechanical Engineering (CGPA: 8.85/10.00) 2009 – 2011

Indian Institute of Technology Madras (IITM), Chennai, India

- Thesis: *Numerical investigation of mixing and combustion of a staged supersonic combustor with strut*
- Advisor: Babu Viswanath, Ph.D.

Bachelor of Technology (B.Tech.), Mechanical Engineering (CGPA: 7.61/10.00) 2005 – 2009

College of Engineering Trivandrum (CET), Thiruvananthapuram, India

- Project: *Numerical simulations of heat transfer and flow friction characteristics of perforated plate matrix heat exchanger*
- Advisor: K. Krishna Kumar, Ph.D.

RESEARCH EXPERIENCE

Post-doctoral Research Associate

Engine Research Center (ERC), University of Wisconsin–Madison, Madison, U.S.A 2018 – present

- Conducted numerical investigations towards the understanding and capability to model the autoignition properties of conventional and unconventional fuels to enable the development of efficient, advanced combustion engines.
- Performed model development and computational fluid dynamics (CFD) simulations of cold-start phase in internal combustion engines.
- Developed and applied a simulation framework to assess the merits of integration of electrical machines and internal combustion engines.

Graduate Student Research Assistant

Clean Combustion Research Center (CCRC), KAUST, Thuwal, Saudi Arabia 2013 – 2018

- Engaged in comprehensive understanding of the fuel-engine interaction required to design future fuels.
- Focused research into autoignition behavior of practical fuels: octane sensitivity, cetane sensitivity and effect of lubricant oil additives on fuel ignition quality.
- Conducted alternative fuels research for sustainable mobility: Methanol, ethanol, butanol, naphtha, biofuels, MTBE, etc.
- Actively engaged in the FUELCOM project funded by Saudi Aramco, focused on developing fuels for next generation engine technology.
- Conducted experimental engine research and detailed simulations to investigate the effects of physical and chemical properties of transport fuels.

Research Assistant

King Abdulaziz City for Science and Technology (KACST), Riyadh, Saudi Arabia 2011 – 2013

- Investigated high efficiency combustion technologies and fuels for advanced automotive propulsion systems and the numerical validation of complex combustion models in engine processes.
- Development and execution of experimental plans to evaluate and analyze the performance and emissions of gasoline of different research octane numbers (RON), under premixed charge compression ignition (PCCI) mode in a single cylinder research engine.
- Developed analytical tools for data reduction to process and analyze raw data using Python.
- Participated in test cell calibration including fuel consumption measurement system and exhaust gas analyzer.
- Provided in-depth interpretation of experimental results, with clear conclusions, recommendations and critical insights into the complex physical phenomena.

Skills

Technical Expertise

Engine combustion, fuel chemistry, surrogate fuels, spray combustion, computational fluid dynamics, fuel characterization, autoignition, combustion

Software Applications

CHEMKIN, Cantera, CONVERGE, EnSight, MATLAB, AVL PUMA & IndiCom, ANSYS, GAMBIT, FLUENT, GT-Power, GNU Octave, PLOTMTV, Tecplot, AutoCAD, Creo Elements/Pro, CATIA

Programming Languages & Document Preparation

Python, C, C++, LaTeX, Shell scripting, VBA, PostScript

Operating Systems

Linux, Macintosh, Microsoft Windows

Publications

20. Abdul Jameel, A.G., **Naser, N.**, & Sarathy S.M. (in press) "Surrogate formulation for diesel and jet fuels using the minimalist functional group (MFG) approach." *Proc. Combust. Inst.*
19. Howard, M., Issayev, G., **Naser, N.**, Farooq, A., Sarathy, S.M., & Dooley, S. (2018) "Ethanolic gasoline, a lignocellulosic advanced biofuel." *Sust. Energ. Fuels.*
18. **Naser, N.**, Sarathy, S.M., & Chung, S.H. (2018). "Ignition delay time sensitivity in ignition quality tester (IQT) and its relation to octane sensitivity." *Fuel*, 233, pp. 412–419.
17. Wakale, A.B., Mohamed, S.Y., **Naser, N.**, Jaasim, M., Banerjee, R., Im, H.G., & Sarathy, S.M. (2018). "An experimental and numerical study of *n*-dodecane/*n*-butanol blends for compression ignition engines." *SAE World Congress 2018.*
16. Abdul Jameel, A.G., **Naser, N.**, Issayev, G., Touitou, J., Ghosh, M.K., Emwas, A.H., Farooq, A., & Sarathy S.M. (2018). "A minimalist functional group (MFG) approach for surrogate fuel formulation." *Combust. Flame*, 192, pp. 250–271.
15. **Naser, N.**, Sarathy, S.M., & Chung, S.H. (2018). "Estimating fuel octane numbers from homogeneous gas-phase ignition delay times." *Combust. Flame*, 188, pp. 307–323.
14. **Naser, N.**, Jaasim, M., Atef, N., Im, H.G., Chung, S.H., & Sarathy, S.M. (2017). "On the effects of fuel properties and injection timing in partially premixed compression ignition of low octane fuels." *Fuel*, 207, pp. 373–388.
13. Al-Khodaier, M., Shankar, V.S.B., Waqas, M., **Naser, N.**, Sarathy, S.M., & Johansson, B. (2017). "Evaluation of anti-knock quality of dicyclopentadiene-gasoline blends." *SAE Technical Paper*, 2017-01-0804.
12. Waqas, M., **Naser, N.**, Sarathy, S.M., Feijs, J., Morganti, K., & Johansson, B. (2017). "Auto-ignition of iso-stoichiometric blends of gasoline-ethanol-methanol (GEM) in SI, HCCI and CI combustion modes." *SAE Technical Paper*, 2017-01-0726.
11. **Naser, N.**, Yang, S.Y., Kalghatgi, G., & Chung, S.H. (2017). "Relating the octane number of fuels to ignition delay times measured in an ignition quality tester (IQT)." *Fuel*, 187, pp. 117–127.
10. Vallinayagam, R., Vedharaj, S., **Naser, N.**, Roberts, W.L., Dibble, R.W., & Sarathy, S.M. (2017). "Terpineol as a novel octane booster for extending the knock limit of gasoline." *Fuel*, 187, pp. 9–15.
9. Abdul Jameel, A.G., **Naser, N.**, Emwas, A.H., Dooley, S., & Sarathy, S.M. (2016). "Predicting fuel ignition quality using ^{1}H NMR spectroscopy and multiple linear regression." *Energy Fuels*, 30, pp. 9819–9835.
8. Alfazazi, A., Kuti, O.A., **Naser, N.**, Chung, S.H., & Sarathy, S.M. (2016). "Two-stage Lagrangian modeling of ignition processes in ignition quality tester and constant volume combustion chambers." *Fuel*, 185, pp. 589–598.
7. Waqas, M., **Naser, N.**, Sarathy, S.M., Morganti, K., Al-Qurashi, K., & Johansson, B. (2016). "Blending octane number of ethanol in HCCI, SI and CI combustion modes." *SAE Int. J. Fuels Lubr.*, 9(3), 2016-01-2298.
6. Sarathy, S.M., Kukkadapu, G., Mehl, M., Javed, T., Ahmed, A., **Naser, N.**, Tekawade, A., Kosiba, G., AlAbbad, M., Singh, E., Park, S., Al Rashidi, M., Chung, S.H., Roberts, W.L., Oehlschlaeger, M.A., Sung, C.-J., & Farooq, A. (2016). "Compositional effects on the ignition of FACE gasolines." *Combust. Flame*, 169, pp.171–193.

5. Ahmed, A., Waqas, M., **Naser, N.**, Singh, E., Roberts, W.L., Chung, S.H., & Sarathy, S.M. (2016). "Compositional effects of gasoline fuels on combustion, performance and emissions in engine." *SAE Int. J. Fuels Lubr.*, 9(3), 2016-01-2166.
4. Kuti, O.A., Yang, S.Y., Hourani, N., **Naser, N.**, Roberts, W.L., Chung, S.H., & Sarathy, S.M. (2016). "A fundamental investigation into the relationship between lubricant composition and fuel ignition quality." *Fuel*, 160, pp. 605–613.
3. Yang, S.Y., **Naser, N.**, Chung, S.H., & Cha., J. (2015). "Effect of temperature, pressure and equivalence ratio on ignition delay in ignition quality tester (IQT): diesel, *n*-heptane, and *iso*-octane fuels under low temperature conditions." *SAE Int. J. Fuels Lubr.*, 8(3), pp. 537–548.
2. Cha, J., Yang, S.Y., **Naser, N.**, Ichim, A.I., & Chung, S.H. (2015). "High pressure and split injection strategies for fuel efficiency and emissions in DI diesel engine." *SAE Technical Paper*, 2015-01-1823.
1. Yang, S.Y., **Naser, N.**, Chung, S.H., & Al-Qurashi, K. (2014). "Ignition delay and soot oxidative reactivity of MTBE blended diesel fuel." *SAE Technical Paper*, 2014-01-1266.

Papers in preparation

4. Angikath, F., **Naser, N.**, & Sarathy, S.M. "Investigating the effects of alcohol blending on ignition quality of gasoline fuels."
3. Nicole, A., **Naser, N.**, Javed, T., Rankovic, N., & Sarathy, S.M. "Detailed kinetic modeling of the impact of ethers on light distillates autoignition."
2. **Naser, N.**, Sarathy, S.M., & Chung, S.H. "Quantitative investigation of the effect of lubricant additives on fuel autoignition quality."
1. **Naser, N.**, Abdul Jameel, A.G., Emwas, A.H., Singh, E., Chung, S.H., & Sarathy, S.M. "Ignition delay times and ^{1}H nuclear magnetic resonance (NMR) spectroscopic analysis of gasoline fractional distillates."

Conference presentations

6. **Naser, N.**, Singh, E., Ahmed, A., & Sarathy, S.M. (2017). "Ignition delay times of gasoline distillation cuts measured with ignition quality tester." *Proc. European Combustion Meeting 2017.*
5. **Naser, N.**, Chung, S.H., & Sarathy, S.M. (2017). "Correlating fuel octane numbers with homogeneous gas-phase ignition delay times." *Proc. of European Combustion Meeting 2017.*
4. **Naser, N.**, Sarathy, S.M., & Chung, S.H. (2016). "Relating fuel octane numbers with stoichiometric ignition delay times." 53^{rd} *KOSCO Symposium - Korean Society of Combust. Symposium, South Korea.*
3. Yang, S.Y., **Naser, N.**, & Chung, S.H. (2015). "Unsteady spray autoignition in IQT - Correlation of octane number and ignition delay of IQT." *ASPACC 2015 - 10th Asia-Pacific Conference on Combust..*
2. Ahmed, A., Khurshid, M., **Naser, N.**, Badra, J., Gaillard, P., Chung, S.H., Roberts, W.L., & Sarathy, S.M. (2015). "Surrogate fuel formulation for light naphtha combustion in advanced combustion engines." *Proc. of the European Combust. Meeting 2015.*
1. Yang, S.Y., **Naser, N.**, & Chung, S.H. (2014). "Autoignition behaviors of unsteady fuel spray in low temperature condition." *FISITA 2014 World Automotive Congress.*

Scholastic achievements

- Recipient of KAUST Graduate Fellowship — 2013 – present
- Recipient of Ministry of Human Resource Development (India) scholarship for graduate studies — 2009 – 2011
- Secured All India Rank 41 (Percentile: 99.82) in Graduate Aptitude Test in Engineering (GATE), Mechanical Engineering discipline — 2009
- Secured state rank 622 in Kerala Engineering Agricultural Medical entrance examination (KEAM), Kerala, India — 2005
- Gulf Physics Olympiad[1] Scholar — 2003
  [1] *The Olympiads are organized by the Council of Central Board of Secondary Education (India) affiliated schools in the Gulf.*
- Gulf Chemistry Olympiad Scholar — 2003
- Gulf Mathematics Olympiad Scholar — 2002

Core competencies

- Excellent written and verbal communication skills
- Strong interpersonal and leadership skills
- Skilled in preparing technical reports, presentations and documents
- Ability to work independently and in multi-disciplinary teams
- Able to make decisions, acts on own initiative and operates in a proactive way
- Extensive knowledge in internal combustion engines and fuel chemistry
- Broad experience in simulation of turbulent, multiphase and reactive flows
- Strong Linux background and proficient in computer programming

References

S. Mani Sarathy
Associate Professor of Chemical Engineering ✉ mani.sarathy@kaust.edu.sa
Clean Combustion Research Center
King Abdullah University of Science and Technology

Suk Ho Chung
Professor Emeritus ✉ sukho.chung@kaust.edu.sa
Clean Combustion Research Center
King Abdullah University of Science and Technology

Sage L. Kokjohn
Assistant Professor of Mechanical Engineering ✉ kokjohn@wisc.edu
Engine Research Center
University of Wisconsin–Madison