

## Kumaran Kannaiyan, Ph.D.,

Assistant Research Scientist, Mechanical Engineering,  
Texas A&M University at Qatar, Doha, Qatar 23874.

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### Highlights:

**Education:** *Ph.D.* (2009) & *M.S.* (2006) in Mechanical Engineering, Indian Institute of Technology Madras (IIT Madras), India; *B.E.* (2001) in Mechanical Engineering, Madurai Kamaraj University, India.

**Employments:** *Assistant Research Scientist* (01.2013 - Present), *Postdoctoral Research Associate* (11.2009 - 12.2012), *Visiting Lecturer* (01.2018 – 04.2018) in Mechanical Eng., Texas A&M University at Qatar (TAMUQ), Qatar; *Research Associate* (07. 2009 - 10.2009) and *Research/Teaching Assistant* (01.2004 - 05.2009) in Mechanical Eng., IIT Madras, India.

**Research Interests:** Alternative fuels; Nanoscale fuel additives; Spray and Combustion diagnostics; Alternative refrigerants; Computational Fluid Dynamics - non-reacting and reacting flows.

**Research Grant:** Lead Principal Investigator (**LPI**): NPRP-7-1499-2-523 (3 years, *US\$ 850k*); UREP21-098-2-044 (1 year, *US\$ 15k*) - both funded by Qatar National Research Fund. **PI**: Qatar Shell Research & Technology Center funded project (3 years, *US\$ 900k*).

**Publication Record:** Book chapters: 3; Journal articles: 13; Conferences: 24; Citations: 220; h-index: 9; i10-index: 8. ([Google scholar webpage](#))

**Research Experience:** 7+ years after Ph.D. in Mechanical Eng., TAMUQ, Qatar; 5 years while doing Ph.D., and M.S., in Mechanical Eng., IIT Madras, India.

**Research Expertise:** *Experimental* - Application of laser diagnostic techniques like Global Sizing Velocimetry, Phase Doppler Anemometry (PDA), and Shadowgraph/Schlieren in non-reacting systems. Hands-on experience with scientific devices like CMOS and CCD cameras, high power lasers, dynamic pressure transducers, thermocouples, and data acquisition systems. *Computational* - Numerical simulations of non-reacting and reacting flows. Advanced knowledge in computational programs like ANSYS-FLUENT, MATLAB.

**Teaching Experience:** Offered lectures on combustion fundamentals to senior students (MEEN 421) in Mechanical Eng., at TAMUQ, Qatar; Tutored engineering drawing-practical sessions for senior students in Mechanical Eng., at IIT Madras, India.

**Mentorship:** Undergraduate: 6; Masters: 3.

**Professional Membership:** Member of ASME, APS, IGTI-Coal Biomass and Alternative fuels committee, Combustion Institute (India Section).

**Academic Services:** Served as reviewer for journals published by Elsevier, Springer, Taylor & Francis, ASME; for funding organization (QNRF), served as conference session chair (APS).

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## Detailed:

### Educational Background:

07. 2009 **Doctor of Philosophy (Ph.D.)** in Mechanical Engineering, IIT Madras, India.  
Advisor: *Prof. Babu Viswanathan*. Thesis title: *Numerical Investigations of the Supersonic Combustion of Hydrogen and Kerosene*
07. 2006 **Master of Science (M.S. by Research)** in Mechanical Engineering, IIT Madras, India.  
Advisor: *Prof. U.S.P. Shet*. Thesis title: *Swirl effects on performance characteristics of pilot-stabilized Open premixed turbulent flames*
05. 2001 **Bachelor of Engineering (B.E.)** in Mechanical Engineering, Madurai Kamaraj University, India  
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### Employments:

- 01.2013 – Present **Assistant Research Scientist**, Mechanical Engineering, TAMUQ, Qatar.
- 01.2018 - 04.2018 **Visiting Lecturer**, Mechanical Engineering, TAMUQ, Qatar
- 11.2009 - 12.2012 **Postdoctoral Research Associate**, Mechanical Engineering, TAMUQ, Qatar.
- 07.2009 - 10.2009 **Research Associate**, Mechanical Engineering, IIT Madras, India.
- 01.2004 - 05.2009 **Research/Teaching Assistant**, Mechanical Engineering, IIT Madras, India.

### Research Interests:

- ❖ Alternative fuels, Nanoscale fuel additives, Spray and Combustion diagnostics
- ❖ Computational Fluid Dynamics: Non-reacting and reacting flows
- ❖ Alternative refrigerants, Multiphase thermo-fluid characteristics.

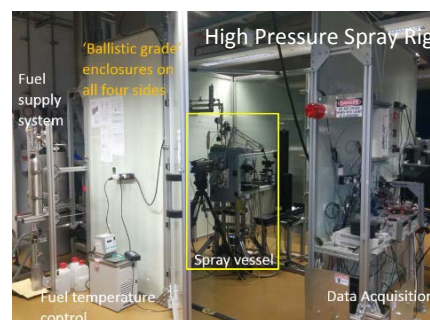
### Research Grants:

- ❖ “In-depth Characterization of Spray and Combustion Performance of Alternative Jet Fuels at Gas Turbine Combustor Conditions (NPRP-7-1499-2-523)”, awarded by Qatar National Research Fund (QNRF) through NPRP program. (02.2015 - 05.2018) – ([Web-link](#)). Total Project Funding: **US\$ 850k**.  
**Lead-Principal Investigator (LPI):** Dr. Reza Sadr, TAMUQ.  
**PIs:** Dr. Kumaran Kannaiyan, TAMUQ; Prof. Hameed Metghalchi, Northeastern University, USA.
- ❖ “Hydrocarbon-CO<sub>2</sub> blends: An Environmentally-Benign Alternative Refrigerants”, awarded by Qatar Shell Research & Technology Center (QSRTC), 01.2018-01.2021.  
**LPI:** Dr. Reza Sadr, TAMUQ. **PIs:** Dr. Kumaran Kannaiyan, TAMUQ; Prof. Hameed Metghalchi and Prof. Yiannis Levendis, Northeastern University, USA.
- ❖ “Effect of Nanoparticles on Alternative Fuel Sprays at High-Pressure Conditions (UREP21-098-2-044)”, awarded by QNRF through Undergraduate Research Experience Program (UREP), 01.2018-01.2019.  
**Primary Research Mentor:** Dr. Kumaran Kannaiyan, TAMUQ.  
**Research Mentor:** Dr. Reza Sadr, TAMUQ.

### Research Experience:

**Assistant Research Scientist:** Currently, involved in two areas of research, alternative fuels and environmental friendly refrigerants. Project #1: This is an upcoming project, where the objective is to investigate the performance of alternative refrigerants (CO<sub>2</sub>-based blends) at the fundamental (properties and heat transfer characteristics) and at the system level (vapor compression cycle) using the existing experimental facility.

Project #2: Investigating the “*Alternative fuel sprays and the role of fuel additives on sprays at elevated ambient conditions using laser diagnostics*.” It is performed in coordination with General Electric in Qatar Science and Technology Park (QSTP) and Northeastern University (NEU), USA. A high pressure-high temperature spray rig is developed to evaluate spray performance at ambient conditions relevant to actual gas turbine combustors. This is a follow-up research of an earlier work at atmospheric ambient conditions. Aside from this, the influence of nanoscale fuel additives and straight vegetable oil (SVO) on fuel spray characteristics are experimentally investigated using optical diagnostic techniques.



**Postdoctoral Research Associate:** “*In-depth Characterization of Synthetic Gas-to-Liquid (GTL) Jet Fuel Combustion Performance in Current & Future Gas Turbine Engines*”. An optically accessible spray experimental facility was designed and developed to study the spray characteristics of several types of GTL fuels and the conventional Jet A-1 fuel. The measurements were performed using laser diagnostic techniques like Global Sizing Velocimetry and phase Doppler anemometry at atmospheric ambient conditions at different nozzle operating conditions. In addition to the experimental work, numerical simulations were also performed using ANSYS-FLUENT to study the effect of particles on jet flows. Apart from the research work at TAMUQ, also had an opportunity to participate and gain experience in conducting the ignition, combustion, and emission experiments for GTL and conventional jet fuels in unique experimental facilities at collaborator organizations:



- i) *Rolls-Royce Plc, UK*: High altitude ignition tests of jet fuels in sub-atmospheric combustor rig.
- ii) *Rolls-Royce Plc, USA*: Emission tests of jet fuels in a full-scale combustor facility.
- iii) *German Aerospace Center (DLR-Stuttgart)*: Flame speed measurements for GTL fuels at atmospheric condition and development of surrogate chemical kinetics for GTL jet fuels

**Research Associate (Ph.D.):** “*Numerical Investigations of the Supersonic Combustion of Hydrogen and Kerosene*”. The supersonic combustion of hydrogen and kerosene fuel in model combustors were numerically simulated. Investigated the influence of chemical kinetics and turbulence models on the predictions of supersonic combustion of hydrogen fuel. For the heavier liquid hydrocarbon fuel, kerosene, the role of spray injection and turbulent dispersion models on the non-reacting and reacting flow predictions were investigated for different model combustor configurations. The numerical scheme was extended to a full-scale supersonic combustor configuration. All the numerical simulations were carried out using ANSYS-FLUENT.

**Research Associate (M.S.):** “*Swirl effects on performance characteristics of pilot-stabilized Open premixed turbulent flames*”. The influence of low-swirl on premixed combustion characteristics, such as flame stability, temperature distribution and combustion noise were experimentally measured. Direct flame images were captured with the help of a CCD camera. An acoustic sound level meter was used to measure the combustion noise, and a Pt/Pt-Rd thermocouple was used to measure the temperature distribution.

## Teaching Experience:

2011-2016: Taught a series of lectures on “Fundamentals of Combustion” to senior students (MEEN 421) at TAMUQ.

2013: Taught lectures on “Application of Thermodynamic laws” to senior students (MEEN 421) at TAMUQ.

2007: Tutored the engineering drawing for senior students in Mechanical Eng., at IIT Madras, India.

## Research Expertise:

- ❖ Designed and developed a spray experimental facility, and performed non-reacting spray measurements of jet fuels, nanofuels, and biofuel, at ‘*atmospheric*’ ambient conditions.

- ❖ Developed a high-pressure spray rig for non-reacting spray characterization of jet fuels at '*elevated*' ambient conditions.
- ❖ Premixed and non-premixed experimental combustion studies.
- ❖ Optical diagnostic measurements using Global Sizing Velocimetry (GSV-TSI), Phase Doppler Anemometry (PDA-Dantech Dynamics), and Shadowgraph.
- ❖ Hands-on experience with scientific devices such as CMOS high speed cameras (Memrecam, Phantom v12.1) and CCD camera (PCO 1600), pulsed (Nd:YAG) and continuous wave (Spectra Physics Ar<sup>+</sup>, Innova I-90-2) lasers, Pressure transducers (static and dynamic-PCB electronics), Data acquisitions systems (LABVIEW).
- ❖ Advanced level of knowledge on scientific tools like ANSYS-FLUENT, GAMBIT, MatLab, SolidWorks, Tecplot, SigmaPlot, Latex etc.

### Achievements/Awards:

- ❖ Awarded '*Second place*': Best Representative Image Outcome of a research project (BRIO), Qatar National Research Fund, 2016.
- ❖ Awarded '*Distinction*': Academic excellence in B.E., Madurai Kamaraj University, 2001.
- ❖ Awarded '*Third Prize*': National Technical Symposium, Sriram Engineering College, India, 2001.
- ❖ Awarded '*Second prize*': National Technical Symposium, Government College of Engineering, India, 2000.
- ❖ Awarded '*Second prize*': Academic excellence (2<sup>nd</sup> year) in B.E., RVSCET, 1999.
- ❖ Awarded '*Second prize*': Academic excellence (3<sup>rd</sup> Semester) in B.E., RVSCET, 1998.

### Professional Membership:

- ❖ Life Member, Combustion Institute (Indian Section)
- ❖ Member, American Society of Mechanical Engineers (ASME)
- ❖ Member, Coal Biomass and Alternative fuels committee – ASME International Gas Turbine Institute (IGTI)
- ❖ Member, American Physical Society (APS) – Division of Fluid Dynamics

### Academic Services:

#### Reviewer (Journal):

- *Fuel* (Elsevier); *Energy Conversion and Management* (Elsevier); *Journal of Visualization* (Springer Link); *ASME Transactions: Journal of Energy Resources Technology*; *Int. J. for Computational Methods in Engineering Science & Mechanics* (Taylor & Francis).

#### Reviewer (Funding Agency):

- Qatar National Research Fund - Secondary School Research Experience Program (SSREP)

#### Session Chair (Conference):

- *American Physical Society-Division of Fluid Dynamics 2015*, Session D14: Industrial Applications-1

#### Mentorship:

- **Master's level: 3**
  - P.R. Behera, "Numerical simulations of supersonic combustion of kerosene in a full-scale combustor", 2008, IIT Madras, India.
  - A. Zeenathul Farida, "Effect of co-flow and swirl air on near burner flame characteristics of partially premixed butane-air tubular burner flames", 2006, IIT Madras, India.
  - Omkar D. Vaidya, "Flame noise from partially-premixed butane-air twin-jet open flame", 2005, IIT Madras, India.
- **Undergraduate students: 6**
  - Al Reem Al-Dosari, Hissa Al-Khatteer, Buthaina Al-Abdulla, "Effect of Nanoparticles on Alternative Fuel Sprays at High-Pressure Conditions", UREP21-098-2-044, 01.2018-01.2019, TAMUQ, Qatar.

- Mohammed AlAthba, "Design and Construction of an optically accessible spray diagnostic facility", senior project, UREP-08-099-2-033, 2011-2012, TAMUQ, Qatar.
- Ayman Yamine, "Nanofuels spray visualization", senior project, Mechanical Engineering, 2014-2015, TAMUQ, Qatar.
- S. Maathangi, "Numerical simulation of supersonic combustion of ethylene in a model combustor", 2008-2009, IIT Madras, India.

### Potential Referees:

- ❖ Prof. Hameed Metghalchi, Professor, Dept. of Mechanical and Industrial Engineering, Northeastern University, Boston, USA, [metghalchi@coe.neu.edu](mailto:metghalchi@coe.neu.edu)
- ❖ Prof. Babu Viswanathan, Professor, Dept. of Mechanical Engineering, Indian Institute of Technology Madras, India, [vbabu@iitm.ac.in](mailto:vbabu@iitm.ac.in)
- ❖ Prof. Reza Sadr, Associate Professor, Mechanical Engineering Program, Texas A&M University at Qatar, Qatar, [reza.sadr@qatar.tamu.edu](mailto:reza.sadr@qatar.tamu.edu)
- ❖ Dr. N. Slavinskaya, Project head, Institute of Combustion Technology, German Aerospace Center, Stuttgart, Germany, [Nadja.Slavinskaya@dlr.de](mailto:Nadja.Slavinskaya@dlr.de)

### Publications: ([Google scholar webpage](#))

Book chapters: 3; Journal articles: 13; International conferences: 24; Citations: 220; h-index: 9; i10-index: 8.

#### Book Chapters:

- [1] Kumaran Kannaiyan and Reza Sadr, "Role of Alternative Aviation Fuels on Reducing the Carbon Footprint", Chapter 33 of ***The Water-Food-Energy Nexus: Processes, Technologies, and Challenges***, Editors: I.M. Mujitaba, R. Srinivasan, and N.O. Elbashir, Taylor & Francis (catalog # K28703): Green Chemistry and Chemical Engineering series, ISBN: 978-1-138-74607-7, 978-1-4987-6083-6, **2018**.
- [2] R Sadr, Kumaran Kannaiyan, K Anoop, and K Tanimizu, "Macro- to Micro-scale Thermo-Fluids research in Energy Efficient Systems," Chapter VI of ***Excellence and Impact of Research at Texas A&M at Qatar***, Editors: M. Weichold, K. Hall, and E. Masad, ISBN 978-99921-95-33-8, p.115, **2013**.
- [3] Kumaran Kannaiyan and R Sadr, "Numerical simulation of coaxial turbulent jet with and without discrete particles," section-5 "turbulent flow" in ***Advances in Fluid Mechanics***, Editors M. Rahman and C.A. Brebbia, ISSN 1743-2533, p 345, **2012**.

#### Journals:

- [1] Kumaran Kannaiyan, and R. Sadr, (2017) "The effect of alumina nanoparticles as fuel additives on the spray characteristics of gas-to-liquid jet fuels", ***Experimental Thermal and Fluid Science***, 87, 93-103, (DOI: 10.1016/j.expthermflusci.2017.04.027, ISSN: 0894-1777).
- [2] G. Yu, O. Askari, F. Hadi, Z. Wang, H. Metghalchi, Kumaran Kannaiyan, and R. Sadr, (2017) "Theoretical prediction of laminar burning speed and ignition delay time of gas-to-Liquid fuel", ***Journal of Energy Resources and Technology***, 139, 022202 pp.1-6 (DOI: 10.1115/1.4033984, ISSN: 0195-0738).
- [3] Kumaran Kannaiyan, K. Anoop, and R. Sadr, (2017) "Effect of nanoparticles on the fuel properties and spray performance of aviation turbine fuel", ***Journal of Energy Resources and Technology***, 139, 032201 pp.1-8 (DOI: 10.1115/1.4034858, ISSN: 0195-0738).
- [4] C. Way Lee, Kumaran Kannaiyan, R. Sadr, and A. Han, (2016) "Fluid dynamics inside a mini-scale microbial energy harvesting system", ***International Journal of Scientific and Engineering Research***, 7 (11), pp.1-7 (ISSN 2229-5518).
- [5] Kumaran Kannaiyan and Reza Sadr, (2014) "Experimental investigation of spray characteristics of alternative aviation fuels", ***Energy Conversion and Management***, 88, pp. 1060-1069 (DOI: 10.1016/j.enconman.2014.09.037, ISSN 0196-8904).
- [6] Kumaran Kannaiyan and Reza Sadr, (2014) "Effect of fuel properties on spray characteristics of alternative jet fuels using Global Sizing Velocimetry", ***Atomization and Sprays***, 24 (7), pp. 575-597 (DOI: 10.1615/AtomizSpr.2014008620, ISSN 1044-5110).



- [7] Kumaran Kannaiyan and Reza Sadr, (2013) "Numerical Simulation of Particle-laden Coaxial Turbulent Jets", **International Journal for Computational Methods in Engineering Science and Mechanics**, 14 (2), pp.61-73 (DOI:10.1080/15502287.2012.690168, ISSN:15502295).
- [8] K. Kumaran, Prabhat Ranjan Behera and V. Babu, (2010) "Numerical Investigation of the Supersonic Combustion of Kerosene in a Full Scale Combustor", **Journal of Propulsion and Power**, 26 (5), pp.1084-1091. (DOI: 10.2514/1.46965, ISSN: 07484658)
- [9] S.L.N. Desikan, K. Kumaran, V. Babu, (2010) "Numerical investigation of the role of hyper-mixers in supersonic mixing", **Aeronautical Journal**, 114 (1161), pp. 659-672. (DOI: 10.1017/ S0001924000004140, ISSN: 00019240)
- [10] K. Kumaran, and V. Babu, (2009) "Investigation of the Effect of Chemistry Models on the Numerical Predictions of the Supersonic Combustion of Hydrogen", **Combustion and Flame**, 156 (4), pp. 826-841. (DOI:10.1016/j.combustflame.2009.01.008, ISSN: 00102180)
- [11] K. Kumaran, and V. Babu, (2009) "Mixing and Combustion Characteristics of Kerosene in a Model Supersonic Combustor", **Journal of Propulsion and Power**, 25 (3), pp. 583-592. (DOI: 10.2514/1.40140, ISSN: 07484658)
- [12] K. Kumaran, and V. Babu, (2009) "A Comparison of Numerical Predictions of the Supersonic Combustion of Hydrogen using S-A and SST K- $\omega$  Models", **Progress in Computational Fluid Dynamics**, 9 (8), pp. 475-489. (DOI: 10.1504/PCFD.2009.027765, ISSN: 17415233)
- [13] K. Kumaran, and U.S.P. Shet, (2007) "Effect of swirl on lean flame limits of pilot-stabilized open premixed turbulent flames", **Combustion and Flame**, 151 (1-2), pp. 391-395. (DOI:10.1016/j.combustflame.2007.06.016, ISSN: 00102180)

### **Conferences:**

#### **Presented:**

- [1] Kumaran Kannaiyan and Reza Sadr, (2017) **70<sup>th</sup> Annual meeting of the American Physical Society-Division of fluid dynamics**, Abstract# A12.00001, Nov. 19-21, Denver, CO, USA.
- [2] Kumaran Kannaiyan, Reza Sadr, (2016) "Influence of nanoparticles on spray performance of alternative jet fuels", **Proceedings of ASME Turbo Expo 2016**, June 13-17, Seoul, S. Korea, GT2016-57778. (DOI: 10.1115/GT2016-57778)
- [3] Kumaran Kannaiyan and Reza Sadr, (2016) **69<sup>th</sup> Annual meeting of the American Physical Society-Division of fluid dynamics**, vol. 61 (20), Abstract# L4.8, Nov. 20-22, Portland, Oregon, USA.
- [4] Kumaran Kannaiyan and Reza Sadr, (2015) **68<sup>th</sup> Annual meeting of the American Physical Society-Division of fluid dynamics**, vol. 60 (21), Abstract# D14.1, Nov. 22-24, Boston, Massachusetts, USA.
- [5] K. Kumaran and Reza Sadr, (2012) "Spray Characterization of Gas-to-Liquid Synthetic Aviation Fuels", **12<sup>th</sup> Triennial International conference on Liquid Atomization and Spray Systems (12<sup>th</sup> ICLASS)**, Heidelberg, Germany, Sep 2-6. (ISBN 978-88-903712-1-9)
- [6] Kumaran Kannaiyan and Reza Sadr, (2010), **63<sup>rd</sup> Annual meeting of the American Physical Society -Division of Fluid dynamics**, vol. 55 (16), Abstract# GV.4, Nov. 21-23, Long Beach, California, USA.

#### **Papers/Posters/Abstracts:**

- [7] G. Yu, O. Askari, F. Hadi, Z. Wang, H. Metghalchi, Kumaran Kannaiyan, and R. Sadr, (2016) "Theoretical prediction of laminar burning speed and ignition delay of gas-to-Liquid fuel", **Proceedings of International Mechanical Engineering Congress & Exposition, IMECE 2016**, Nov. 11-17, Phoenix, Arizona, USA, IMECE2016-65440.
- [8] A. Kanjirakat, Kumaran Kannaiyan, R. Sadr, (2015) "Preparation of aviation fuel based nanoparticle colloids and prospects of its application in pressure atomizers", **6<sup>th</sup> International Colloids Conference**, 21-24 June, Berlin, Germany (*Poster*).
- [9] A. Yamine, Kumaran Kannaiyan, R. Sadr, (2015) "Spray visualization of alternative aviation turbine fuel embedded with metallic nanoparticles", **10<sup>th</sup> Pacific Symposium on Flow Visualization and Image Processing**, 15-18 June, Naples, Italy,
- [10] Reza Sadr and Kumaran Kannaiyan, (2015) "Investigation of nanofuel spray and droplet formation", **Proceedings of EMN Droplets 2015**, May 8-11, Phuket, Thailand, Abstract: B25 (Invited Talk).
- [11] Kumaran Kannaiyan and Reza Sadr, (2013) **66<sup>th</sup> Annual meeting of the American Physical Society-Division of fluid dynamics**, vol. 58 (18), Abstract# R28.8, Nov. 24-26, Pittsburgh, Pennsylvania, USA.

- [12] Kumaran Kannaiyan and Reza Sadr, (2014) "Experimental study of the effect of fuel properties on Spray performance of alternative jet fuel", **Proceedings of ASME Turbo Expo 2014**, Vol. 3A, June 16-20, Dusseldorf, Germany, GT2014-25842. (DOI: 10.1115/GT2014-25842, ISBN: 978-0-7918-4565-3)
- [13] Kumaran Kannaiyan and Reza Sadr, (2013) **66<sup>th</sup> Annual meeting of the American Physical Society-Division of fluid dynamics**, vol. 58 (18), Abstract# R28.8, Nov. 24-26, Pittsburg, Pennsylvania, USA.
- [14] Kumaran Kannaiyan and Reza Sadr, (2013) "Spray Characteristics of Fischer-Tropsch Alternate Jet Fuels", **Proceedings of ASME Turbo Expo 2013**, Vol.2, June 3-7, San Antonio, USA, GT2013-95761. (DOI:10.1115/GT2013-95761, ISBN: 978-0-7918-5513-3)
- [15] Kumaran Kannaiyan and Reza Sadr, (2012) **65<sup>th</sup> Annual meeting of the American Physical Society -Division of Fluid dynamics**, vol. 57 (17), Abstract# R21.2, Nov. 18-20, San Diego, California, USA.
- [16] N. Slavinskaya, U. Riedel, E. Saibov, and Kumaran Kannaiyan, (2012) "Surrogate Model Design for GTL Kerosene", **50<sup>th</sup> AIAA Aerospace Sciences Meeting and Exhibit**, Tennessee, USA, Jan 9-12, AIAA-2012-0977. (DOI:10.2514/6.2012-977)
- [17] Kumaran Kannaiyan and Reza Sadr, (2011), **64<sup>th</sup> Annual meeting of the American Physical Society -Division of Fluid dynamics**, vol. 56 (18), Abstract# H9.9, Nov. 20-22, Baltimore, Maryland, USA.
- [18] D. Fyffe, J. Moran, Kumaran Kannaiyan, R. Sadr and A. Al-Sharshani, (2011) "Effect of GTL-like Jet Fuel Composition on GT Engine Altitude Ignition Performance Part I: Combustor Operability", **Proceedings of ASME Turbo Expo 2011**, June 6-10, Vancouver, Canada, GT2011-45487. (DOI: 10.1115/GT2011-45487, ISBN: 978-0-7918-5462-4)
- [19] T. Mosbach, G. C. Gebel, P. Le Clercq, R. Sadr, Kumaran Kannaiyan, and A. Al-Sharshani, (2011) "Investigation of GTL-like Jet Fuel Composition on GT Engine Altitude Ignition and Combustion Performance Part II: Detailed Diagnostics", **Proceedings of ASME Turbo Expo 2011**, June 6-10, Vancouver, Canada, GT2011-45510. (DOI: 10.1115/GT2011-45510, ISBN: 978-0-7918-5462-4)
- [20] Reza Sadr and Kumaran Kannaiyan, (2010), **63<sup>rd</sup> Annual meeting of the American Physical Society -Division of Fluid dynamics**, vol. 55 (16), Abstract# MX.7, Nov. 21-23, Long Beach, California, USA.
- [21] K. Kumaran and V. Babu, (2009) "A comparison of Numerical Predictions of Supersonic Combustion of Hydrogen using different Chemistry models in a Model Combustor", **47<sup>th</sup> AIAA Aerospace Sciences Meeting and Exhibit**, Florida, USA, Jan 5-8, AIAA-2009-0716. (DOI:10.2514/6.2009-716)
- [22] K. Kumaran, and U.S.P. Shet, (2005) "Studies on Flame Characteristics of Swirled-Turbulent Open Premixed Nozzle Flames", **Proceedings of 5<sup>th</sup> Asia-Pacific Conference on Combustion**, July 17-20, Adelaide, Australia. (ISBN: 0975785508, 0975785516).
- [23] A. Zeenathul Farida, K. Kumaran, U.S.P. Shet, and T. Sundararajan, (2005) "Stability of Partially Premixed Tubular Burner Flames with Co-Flow and External Swirl-Air", **Proceedings of the 5<sup>th</sup> Asia-Pacific Conference on Combustion**, July 17-20, Adelaide, Australia. (ISBN: 0975785508, 0975785516).
- [24] K. Kumaran, and U.S.P. Shet, (2005) "Combustion Noise Emission from Swirled Turbulent Open Premixed Nozzle Flames", **International Conference on Computational and Experimental Engineering and Sciences**, December 1-6, Indian Institute of Technology Madras, Chennai, India.

## Personal Details:

Sex : Male  
Nationality : Indian  
Marital Status : Married