

JOHN T SOLOMON

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EDUCATION

Ph.D. in Mechanical Engineering, Florida State University, Fall-2010

Dissertation Title: [High Bandwidth Unsteady Micro-actuators for Active Control of High-Speed Flows](#)

M. Tech in Mechanical Engineering, National Institute of Technology, Calicut, India,
Spring-2002

Thesis Title: Studies on Heat transfer and Flow Friction Characteristics in Mini Channels

B. Tech in Mechanical Engineering, College of Engineering, Trivandrum, India, Fall-1998

PREFESSIONAL EXPERIENCE

2018 August-Till now – Associate Professor, Tuskegee University

2012 August-2018 July- Tenure Track Assistant Professor, Tuskegee University

2010- 2012 July: Assistant Professor (Adjunct), Florida State University

: Research Associate, Florida Center for Advanced Aero Propulsion

2006- 2010: Graduate Research Assistant, Teaching Assistant, Florida State University

2002- 2005: Faculty in Mechanical Engineering, National Institute of Technology, Calicut, India.

RESEARCH INTERESTS

Experimental fluid mechanics, High speed flow control, Microactuator development, Microscale flow diagnostics, Engineering Education, Curriculum development

TEACHING

Teaching Evaluation Summary (2012- 2017) Tuskegee University

Scale 5-Excellent to 1 poor (mean/5.0)

*Data available on request

Semester	Year	Instructor	Dept.	Course Name	*Avg.
Spring	2017	John Solomon	MENG	Fluid Mechanics	4.7
Spring	2017	John Solomon	MENG	Thermal Sciences Laboratory	4.5
Spring	2017	John Solomon	MENG	Heating Ventilating & Air Cond	4.5

Spring	2016	John Solomon	MENG	Thermal Sciences Laboratory	4.8
Spring	2016	John Solomon	MENG	Heating Ventilating & Air Cond	5.0
Spring	2016	John Solomon	MENG	Renewable Energy	4.7
Fall	2016	John Solomon	MENG	Fluid Mechanics	4.5
Fall	2016	John Solomon	MENG	Thermal Sciences Laboratory	4.5
Fall	2016	John Solomon	MENG	Heating Ventilating & Air Cond	4.7
Spring	2015	John Solomon	MENG	Heating Ventilating & Air Cond	4.8
Spring	2015	John Solomon	MENG	Renewable Energy	4.3
Spring	2015	John Solomon	MENG	Thermal Sciences Laboratory	4.3
Fall	2015	John Solomon	MENG	Thermal Sciences Laboratory	4.7
Fall	2015	John Solomon	MENG	Heating Ventilating & Air Cond	4.8
Fall	2015	John Solomon	MENG	Fluid Mechanics	3.3
Spring	2014	John Solomon	MENG	Thermal Sciences Laboratory	4.4
Spring	2014	John Solomon	MENG	Heating Ventilating & Air Cond	4.3
Spring	2014	John Solomon	MENG	Renewable Energy	4.3
Fall	2014	John Solomon	MENG	Fluid Mechanics	4.6
Fall	2014	John Solomon	MENG	Thermal Sciences Laboratory	4.4
Fall	2014	John Solomon	MENG	Heating Ventilating & Air Cond	4.1
Fall	2013	John Solomon	MENG	Heating Ventilating & Air Cond	4.5
Spring	2013	John Solomon	MENG	Heat Transfer, Thermal lab, HVC	**N.A
Fall	2012	John Solomon	MENG	Heat Transfer, Fluids, Thermal lab	N.A
Average score 4.5/5.0					

**not available

Teaching Evaluation Summary at Florida State University -2011 Jan 2012 July (Mean/5.0)

Scale 5 – Excellent to Poor-1			*Overall Instructor Rating (Mean/5.0)
Spring 2011	EML 4711/EML 5710	Introduction to Gas Dynamics.	4.5
Fall 2011	EML3016C	Thermal Fluids II	4.0
Spring 2012	EML 4304	Thermal-Fluids Lab	4.4

Teaching Experience Prior Ph.D. at National Institute of Technology Calicut, India (2002-2005)

Teaching evaluation average 4/5		
Spring 2002	MENG 402	Dynamics of Machines
Fall 2002	MENG 202	Engineering Mechanics (Statics and Dynamics)
Spring 2003	MENG 304	Hydraulic Machines
Fall 2003	MENG 303	Fluid Mechanics
Spring 2004	MENG 405	Heat Transfer
Fall 2004	MENG 302	Thermodynamics-I
Spring 2015	MENG 102	Engineering Graphics

RESEARCH

PATENT

- High Bandwidth & Control Authority Micro-Actuators for Active Flow & Noise Control – 8,286, 895 -October 2012 (Alvi, Kumar, Solomon), Florida State University.

Pending Application

- Resonance Enhanced Microactuator Nozzles for Supersonic Flow Mixing –Provisional Patent Application is in process. Tuskegee University IP committee has approved this provisional patent application in 2017 July.

PROPOSALS FUNDED as PI

1. Tailoring Jet Instabilities Using Ultra-sonic Microactuators- Research Initiation Award- National Science Foundation PI (240 k) 2015-2019. **Single PI**
2. Tailored Instruction and Engineered Delivery Using Protocols (TIED-UP) Funded by National Science Foundation I-USE program. **PI (250k) 2015-2018.** Co-PIs Vinu Unnikrishnan (University of Alabama, Eric Hamilton (Pepperdine University, Firas Akasheh Tuskegee University)

RESEARCH PUBLICATIONS

1. **J.T. Solomon.**, K. Cairnes, C. Nayak., M. Jones, D. Alexander, "Design and Characterization of Nozzle Injection Assemblies Integrated High-frequency Microactuators", *AIAA Journal* Vol. 56, No. 9, pp. 3436-3448, 2018.
2. **J.T. Solomon.**, V. Viswanathan, E. Hamilton, C. Nayak, "A PROTOCOL Based Blended Model for Fluid Mechanics Instruction", Submitted to *Advances in Engineering Education (AEE) journal* and *under second review-Aug2018*
3. **J.T. Solomon.**, E. Hamilton, V. Viswanathan, C. Nayak, F. Akasheh "A PROTOCOL Based Blended Model for Fluid Mechanics Instruction", ASEE-22514, 2018.
4. V. Viswanathan and **J.T. Solomon.**, "A Study on the Student Success in a Blended-Model Engineering Classroom", ASEE 2018.
5. F Akasheh, **J Solomon.**, E Hamilton, C Nayak, V. Viswanathan, "Application of Brain-based Learning Principles to Engineering Mechanics Education: Implementation and Preliminary Analysis of Connections Between Employed Strategies and Improved Student Engagement", ASEE 2018.
6. **J.T. Solomon.**, C. Nayak., K. Cairnes, D. Alexander, M. Jones, "Resonance Enhanced Microactuator Nozzles for high-speed flow mixing", *AIAA Aviation Forum*, Colorado, 2017-4308.
7. **J.T. Solomon.**, D. Alexander, C. Nayak, J. Howard, L. Lewis, P. Kreth., "Temporal Flow Characteristics of High-Frequency Supersonic Actuators Integrated in REM-Nozzle Assembly", *ICTACEM conference IIT Kharagpur, India*, 2017.

8. **J.T. Solomon.**, C. Nayak, V. Viswanathan, E. Hamilton., “Improving Student Engagement in Engineering Using Brain Based Learning Principles as Instructional Delivery Protocols” ASEE, 2017-17913.
9. **J.T. Solomon.**, C. Nayak., K. Cairnes, D. Alexander, M. Jones, Higgins., "High-Speed Flow Mixing Using High-frequency Microactuators ", AIAA 1885- 2017.
10. MY Ali, N Arora, M Topolski, FS Alvi, **JT Solomon**, “Properties of Resonance Enhanced Microjets in Supersonic Crossflow” AIAA Journal, *AIAA Journal*, Vol. 55, No. 3 (2017), pp. 1075-1081. <https://doi.org/10.2514/1.J055082>
11. **J.T. Solomon**, V. Unnikrishan, V. Viswanathan, E. Hamilton., “Course material delivery in engineering using brain-based learning techniques Frontiers in Education Conference (FIE), 2016 IEEE, 2016.
12. C. R. Nayak, V. Viswanathan, **J.T. Solomon** “The first step towards a pre-requisite knowledge tracking architecture for engineering programs”- Frontiers in Education Conference (FIE), 2016 IEEE, 2016
13. V. Viswanathan, **J.T Solomon.**, “Improving Student Engagement in Engineering Classrooms: The First Step toward a Course Delivery Framework using Brain-based Learning Techniques, ASEE- 2016-16685.
14. Uzun, A., **Solomon, J.T.**, Foster, C.H., Oates, W.S., Hussaini, M.Y., Alvi, F.S., “Flow physics of a pulsed microjet actuator for high-speed flow control”, *AIAA Journal* Volume 51, No. 12, pp 2894-2918, 2013.
15. **Solomon, J. T.**, Foster, C., Alvi F.S., “Design and characterization of High-Bandwidth, Resonance Enhanced, Pulsed Microactuators: A parametric Study”, *AIAA Journal*, Volume 51, No. 2, pp 386-396, 2013.
16. **Solomon, J.T.**, Kumar R., Alvi F.S., “High Bandwidth Pulsed Microjets for High Speed Flow Control”, *AIAA Journal*, Volume 48, No. 10, 2010, pp 2386-2396.
17. Topolski, N., Arora, N., Ali, M.Y., **Solomon, J.T.**, Alvi, F.S., “Study on Resonance Enhanced Microactuators in Supersonic Crossflow”, AIAA-2813, 2012
18. Garret, S., **Solomon, J.T.**, Gustavson, G., Alvi, F.S., “Implementing Resonance Enhanced Microactuators for the control supersonic microjets”, AIAA-0065, 2012.
19. Uzun, A., Foster, C.H., **Solomon, J.T.**, Oates, W.S., Hussaini, M.Y., Alvi, F.S., “Simulations of Pulsed Microactuators of High –Speed Flow Control”, AIAA-2938, 2011.
20. Kreth, P., **Solomon, J.T.**, Alvi, F.S., “Resonance-Enhanced High Frequency Microactuators with Active Structures”, AIAA-2939, 2011.
21. Foster, C., **Solomon, J.T.**, Alvi, F.S., “Visual Study of Resonance dominated Microjet flows using laser based micro- Schlieren”, AIAA-2011-766, 2011.
22. **Solomon, J.T.**, PhD dissertation, Florida State University, 2010.
23. Ali, M.Y., **Solomon, J.T.**, Gustavsson, J., Alvi, F.S., “Control of Supersonic Cavity Flows Using High Bandwidth Micro actuators”, AIAA-197194-564, 2010.
24. **Solomon, J.T.**, Alvi, F.S., Kumar, R., Gustavsson, J., “Principles of a High Bandwidth Microactuator Producing Supersonic Pulsed Microjets”, AIAA-197237-476, 2010.
25. **Solomon, J.T.**, Wiley, A., Kumar, R., Alvi, F.S., “Active and Adaptive Control of Supersonic flow using High Bandwidth Pulsed Micro-actuators”, FCAAP meeting Aug 13-14, 2009.
26. **Solomon, J.T.**, Wiley, A., Kumar, R., Alvi, F.S., “Development and Implementation of High Frequency Pulsed Microactuators for Active Control of Supersonic Impinging Jet”, SAROD meeting, National Aerospace Lab, India, 2009.

27. **Solomon, J.T.**, Hong, S., Wiley, A., Kumar, R., Annaswamy, A.M., Alvi, F.S., “Control of Supersonic Resonant flows Using High bandwidth Micro- Actuators”, AIAA -3247, 2009.
28. **Solomon, J.T.**, Kumar, R., Alvi, F.S., “Development and characterization of High bandwidth micro actuator”, ASME FEDSM 55032, 2008.
29. **Solomon, J.T.**, Kumar. R, Alvi, F.S., “High band width pulsed micro actuators for active flow control’, AIAA-3042, 2008.
30. Hogue, J., **Solomon, J.T.**, Oates, W., Alvi, F.S., “Broadband Pulsed Flow Using Piezoelectric Microjets., Proc. SPIE 7643, 76431V (2010); doi:10.1117/12.847560
31. Liu, F., Hogue, J., Oates, W., **Solomon, J.T.**, Alvi, F.S., “Piezo electric controlled Pulsed microjet actuation” ASME SMASIS1448, California 2009.
32. **Solomon, J.T.**, Sobhan, C.B., “Experimental Investigations on Fluid flow and Heat Transfer through Rectangular Minichannels”, ASME Fluid Engineering Summer conference, Huston, TX, 2005.
33. Sobhan, C.B., **Solomon, J.T.**, “Flow transitions and Convective Heat Transfer in Single Phase flow Through Mini channels,” 6th ASME-JSME Thermal Engineering Joint Conference, Hawaii, 2003.

Google scholar citation: <https://scholar.google.com/citations?user=91W5HpIAAAAJ&hl=en>

Citation: 173 h-index -8 i10-index- 8

HONORS & AWARDS

- Outstanding faculty performance award, 2017 Tuskegee University
- Research Initiation Award, 240k, 2015 National Science Foundation
- Graduate research and **creativity** award nomination by FAMU-FSU College of Engineering, 2010.
- Outstanding graduate seminar award of Mechanical engineering Department, FSU spring-2008

RESEARCH STUDENTS

No	Name	MS/BS	Status
1	Brian Barret	MS -2016	Graduated -Engineer in Sonoco Products
2.	David Alexander	MS- 2017	Graduate in Spring 2018 –Offer from Los Alamos National Lab
3	Kyren Caines	BS- 2016	Completed- Engineer in Lockheed Martin
4.	Michael Jones	BS- 2016	In Grad school
5.	Frederick Higgins	BS- 2015	In Grad school
6	Jordan Ford	BS -2014	In Grad school
7.	David Alexander	BS- 2015	In Grad School
8	Brian Barret	BS- 2014	Engineer in Sonoco
9.	Howard Jarvis	BS- 2017	Undergraduate student-ongoing
10	Leavohn Lewis	BS- 2017	Undergraduate student-ongoing

PROFESSIONAL ACTIVITIES

Professional Society Memberships:

- American Institute of Aeronautics and Astronautics (AIAA) Senior Member
- American Society of Engineering Education (ASEE) Member
- Sigma Xi member

Service

- Member TU faculty Senate
 - Executive Member in Tuskegee University faculty Center for Teaching and Learning. (2013-2014)
 - Tuskegee University Faculty Advisor for student registration and advising (2012-2017)
 - ABET committee member of Mechanical Department for Cumulative Data Collection and analysis (2015-2018)
 - Reviewer of articles from
 - a. AIAA journal
 - b. Experiments in Fluids
 - c. International Journal for Aerospace Engineering
 - d. Journal of micro machines
 - e. Journal of Shockwaves
 - Served as Judge of AIAA (American Institute of Aeronautics and Astronautics) Huntsville division annual section awards
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CONTINUING EDUCATION –TRAINING PROGRAM

- Short term course on “Instructional Design and Delivery” conducted by Technical Teachers’ Training Institute Chennai, Government of India, MHRD, 2004
- ISTE workshop on “Teacher effectiveness” conducted by National Institute of Technology Calicut. 2004
- Preparing future faculty workshop, organized by Florida State University, 2009
- Major Research Instrumentation award proposal preparation workshop, BWI Airport Hotel. Conducted by QEM network funded by NSF, Nov2-3, 2012
- “Strategies that promote active learning”, Oct 31-Nov 1, 2013. Professional development intensive workshop, Tuskegee University. Conducted by Tuskegee University faculty Center for Teaching and Learning, 2013
- “Embracing change as University Faculty: What is a Professor Do” Professional development intensive workshop, Tuskegee University. Conducted by Tuskegee University faculty Center for Teaching and Learning, March 24-25, 2014,
- “Participatory applied research on enhancing learning, a spectrum of small change to transformation” professional intensive workshop I, Conducted by Tuskegee University faculty Center for Teaching and Learning, January 22-23, 2014
- “Faculty collaborative presentations” April 3, 2014. Professional development intensive workshop” Conducted by Tuskegee University faculty Center for Teaching and Learning, April 3, 2014.

- “The science of learning: Its Utility in Learning, an extended professional development workshop”. Conducted by Tuskegee University faculty Center for Teaching and Learning, April 4, 2014
- Train the trainer workshop, for critical thinking assessment (CAT) Two-day workshop conducted by center for assessment and improvement of learning, by Tennessee Tech University. Workshop was in San Antonio, Texas, November 16-17, 2015,
- AAAS and NSF En-FUSE Symposium, DC, 2016

SYNERGISTIC ACTIVITIES AT TUSKEGEE UNIVERSITY

1. New Research Lab establishment at Tuskegee University, 2016 (with support from NSF)

A new experimental flow diagnostic laboratory (fig.1) has been established by Dr. Solomon for graduate and undergraduate research.

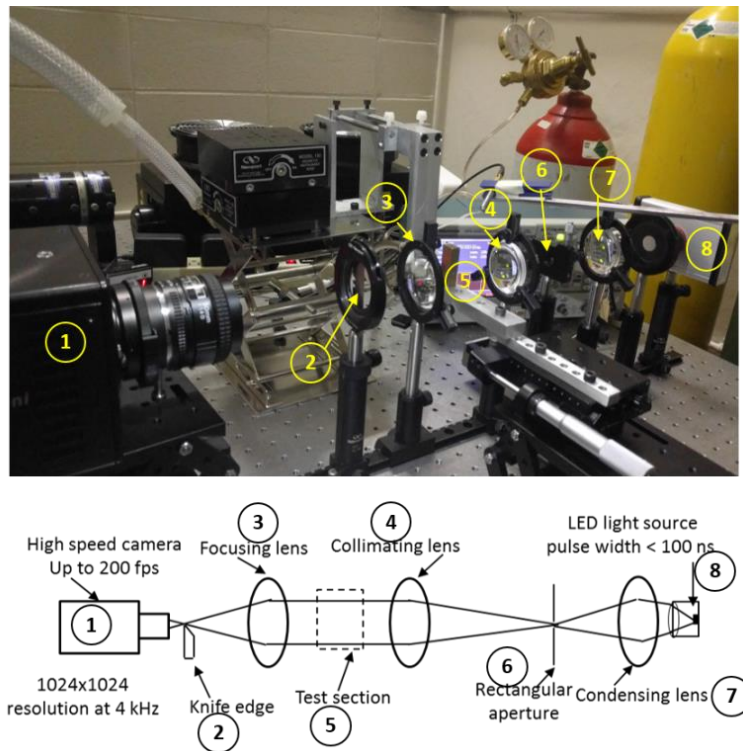


Fig. 1 New flowdiagnostic lab established with support from NSF

The lab is equipped with a high-speed camera that can go up to 4000 frames per second at full resolution (1020x1020 pixels) up to 200,000 fps at a lower resolution. A micro-schlieren flow visualization system is developed for high speed flow visualization. The lab is equipped with state-of-the-art data acquisition systems from National Instruments, LabVIEW and a workstation. 5 undergraduate students and 1 master student were trained in conducting research in this laboratory from 2015-2017.

2. Development of new teaching methodology using brain based learning model TIED UP (with support from NSF) <http://bit.ly/tuskegee-tiedup>.

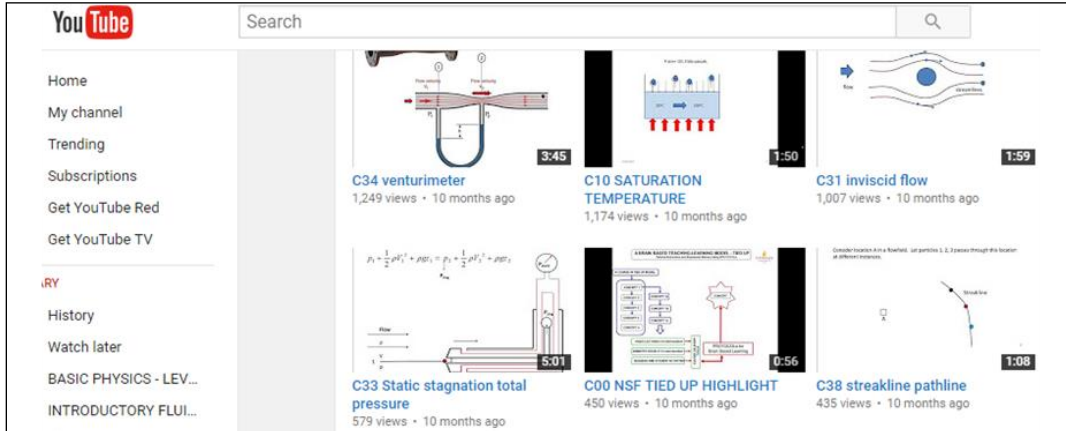


Fig. 2 Eighty videos (2-6 minutes duration) developed and used in TIED-UP model. These scripted and animated videos are currently engaging a larger learning community all over the world.

A protocol based, media rich teaching methodology has been developed by Dr. Solomon which is successfully implemented at Tuskegee University. The brain-based teaching learning model TIED UP (tailored instructions and engineered delivery) has improved student engagement and helped systematic and successful learning in engineering class rooms. Engineering concepts are presented using short animated video lectures (4-6 mints) and other teaching-learning tools that are developed using PROTOCOLS. More details and highlights of TIED UP and

TIED UP concept movies developed are available at <http://bit.ly/tuskegee-tiedup>.