

Thomas Arthur Ward

PhD, MSc, BSc, CEng, FIMechE, SMAIAA, MIEM

Associate Professor and Aerospace/Mechanical/Systems Engineer

PERSONAL DATA

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EDUCATION

- **Ph.D. Mechanical Engineering – University of Dayton, OH, US (1998 – 2003)**
 - Dissertation: *Physical and Chemical Behavior of Endothermic Jet Fuel*
 - Original research into endothermic fuels as a potential solution to the increased cooling demands posed by hypersonic aircraft and single-stage-to-orbit spacecraft
- **MSc Aerospace Systems Engineering – Loughborough University, UK (1993 –1995)**
 - Distinguished Graduate Honors
- **MSc Aerospace Engineering – University of Dayton, OH, US (1990 – 1993)**
- **BSc Aerospace Engineering – University of Cincinnati, OH, US (1984 – 1989)**
 - Professional Practice Certificate

ACADEMIC WORK EXPERIENCE

Aug 18 – present

Associate Professor

Cedarville University, School of Engineering & Computer Sciences, Ohio, United States



- Teaching courses in: Thermodynamics, Heat Transfer, Thermal Systems, and Mechanical Engineering Lab 1 and 2.

Aug 16 – Aug 18

Associate Professor and Associate Dean (Science and Engineering)

Heriot-Watt University, School of Engineering & Physical Sciences (EPS), Putrajaya, Malaysia



- Associate Dean of the University (Science and Engineering), term: Apr 1, 2018 – Dec 31, 2020
- University Senator, elected member, term: Aug 1, 2017 - July 31, 2020
- Research Management Committee (RMC) Malaysia, EPS representative.
- Malaysia Research Assessment (MYRA) auditor
- Academic Council (Malaysia) member
- Lecture Capture Working Group member
- Teaching courses in: Fluids-1, Fluids-2, Mechanical Engineering Science 9, Foundations of Energy, Advanced Renewable Energy, and Group Design Project. Many of these courses were new to this campus, so I created the original lecture materials and tutorials.
- Planner and participator in Global Challenges Workshop held on the Dubai, Malaysia, and Edinburgh campuses.

Mar 12 – Mar 16



Senior Research Fellow (Principal Research Investigator and Lecturer)
University of Malaya, Dept. of Mechanical Engineering, Kuala Lumpur, Malaysia

- Principal Investigator of research on Biomimetic Micro Air Vehicles (BMAV)
- Taught courses in: Aerospace Propulsion Systems, Critical Thinking, Communications Skills, Statics, and rebuilt and directed all of the Mechanical Engineering Lab courses
- Faculty Director of UM student teams designing and racing ultra-efficient cars in the Shell Eco-Marathon Asia international competition (with several wins).
- Founder of the UM Aerospace Laboratory and Student Competitions Workshop
- Primary faculty resource person in building integrated design into the curriculum

Jan 06 – Jul 11



Associate Professor (Principal Research Investigator and Lecturer)
Universiti Teknologi MARA (UiTM), Faculty of Mechanical Engineering, Shah Alam, Malaysia

- Principal investigator of research on a hydrogen fuel cell powered unmanned aircraft.
- Taught courses in: Aerospace Propulsion Systems, Fluid Mechanics, Heat Transfer, Integrated Engineering Design, Thermofluids Lab, and Final Year Project.
- Faculty Director of UiTM student teams competing in Shell Eco-Marathon Asia.
- Improved the curriculum necessary for local and IMechE accreditation.
- Co-founder of Alternative Energy Laboratory and Flight Test and Technology Center.
- Chaired committees on international grants and English language proficiency.

INDUSTRY WORK EXPERIENCE

Apr 16 – Aug 16



Engineering Consultant
4-month contract with *Horizon Fuel Cell Malaysia Sdn Bhd, Kuala Lumpur, Malaysia*

- Provided engineering consultation to design a solar-powered lighter-than-air vehicle to be used as an airborne platform to provide Internet access in rural areas of Malaysia.

Jun 89- Jul 05



Aerospace Engineer (Aircraft and Missile Systems Engineer and Analyst)
National Air and Space Intelligence Center, Wright-Patterson Air Force Base, Ohio USA

- USAF member of the national committee on Air Weapon Systems in Washington DC. Briefed the USAF Chief of Staff and other four-star generals.
(*Top Secret/SCI security clearance.*)
- Primary duties: Project systems leader coordinating a group of US national experts responsible for research and analysis of military aerospace systems (e.g. fighters, surveillance aircraft, transport aircraft, and air-launched missiles).
- Developed realistic air combat simulators for the F/A-22 and F-35 fighters. This involved running air combat simulation trials with experienced USAF and RAF fighter pilots.
- Conducted research on endothermic jet fuels with the Propulsion Directorate of the USAF Research Laboratories.
- USAF integrated engineer with the Ministry of Defence, United Kingdom in London. Served as the UK air-to-surface missile expert and desk officer (5 years).
- Verified compliance with US arms control treaties (INF, START, Open Skies, the Chemical Weapons Convention, and MTCR).



Mar 87 – Dec 88



Aerospace Engineer (student internship/cooperative education program)
4950th Test Wing, Aircraft Modification Division, Wright-Patterson Air Force Base, Ohio USA

- I was a student intern responsible for designing and analyzing structural modifications made on test aircraft.
- Also gained experience with machine shop and sheet metal fabrication.

Jan 86 – Sep 86



Aerospace Engineer (student internship/cooperative education program)

Control Data Corporation, Southfield, MI USA

- I was a student intern responsible for performing structural analysis of automated mechanical systems used in factories and assembly plants.

CERTIFICATIONS AND PROFESSIONAL MEMBERSHIPS

- **Chartered Engineer** - Engineering Council (United Kingdom)
- **Registered Engineer** – Board of Engineers (Malaysia)
- **Acquisition Certification** – Level 1 (US Department of Defense)
- **Institute of Mechanical Engineers (IMechE)** – Fellow
- **American Institute of Aeronautics and Astronautics (AIAA)** – Permanent Senior Member
- **Institute of Engineers, Malaysia (IEM)** – Corporate Member (Engr)
- **Society of Engineering Education Malaysia (SEEM)** – Professional Member

RESEARCH AWARDS (SELECTED SAMPLE)

Fuel Cell Powered Unmanned Air Vehicle (*Kenyalang-1 UAV was first fuel cell UAV designed in SE Asia*)

- **Gold Medal**, 1st Innovation, Invention and Design Competition, Faculty of Mechanical Engineering, Universiti Teknologi MARA (UiTM), Malaysia, 2012. *Project leader of team that developed the first fuel cell powered unmanned aircraft in Southeast Asia.*
- **2nd Place (Cash Award) for Best Innovation**, International Conference on Advances in Mechanical Engineering (ICAME 2010), Shah Alam, Malaysia, 2010.
- **Bronze Medal**, Malaysia Technology Expo 2010, Putra World Trade Centre, Kuala Lumpur, Malaysia, 2010.
- **Silver Medal**, Invention, Innovation, and Design (IID) 2010 Conference, Universiti Teknologi MARA (UiTM), Malaysia, 2010.
- **Best Prototype (trophy and cash award)**, Malaysia National Invention Competition, Universiti Teknologi Malaysia (UTM), Malaysia, 2010.
- **Bronze Medal**, National Research and Innovation Competition (NRIC), Universiti Sains Malaysia (USM), Malaysia, 2009.

Shell Eco-Marathon Asia

- **Silver Medal (2nd Place) Best Fuel Cell Powered Car 2016 - Prototype Category**, Philippines. Directed University of Malaya team. Won \$1000 USD cash award.
- **Silver Medal (2nd Place) Best Fuel Cell Powered Car 2015 - Prototype Category**, Philippines. Directed University of Malaya team. Won \$1000 USD cash award.
- **Silver Medal (2nd Place) Best Fuel Cell Powered Car 2012 - Prototype Category**, Malaysia. Directed University of Malaya team. Won \$1000 USD cash award.
- **Certificate of Appreciation** – Displayed winning car at International Green Expo, Malaysia 2012.
- **Best Malaysian Team 2011** – Trophy and RM 10,000 cash prize awarded by a panel of judges consisting of Malaysian university professors and Shell executives. Directed Universiti Teknologi MARA team.
- **Gold Medal (1st Place) Best Fuel Cell Powered Car 2010 - Prototype Category**, Malaysia. Presented in gratitude by the winning team from Universiti Teknologi Malaysia (UTM) for my critical technical support in providing their fuel cell system.

Hydrocelium technology research project

- **Gold Medal**, Belgian & International Trade Fair for Technological Innovation 2009. *Electrochemical extraction of hydrogen gas from water to improve the fuel efficiency of cars.*

TEACHING AWARDS

- **Certificates of Teaching Excellence**, University of Malaya. For academic years 2012-2013 and 2013-2014.

US AIR FORCE AWARDS (SELECTED SAMPLE)

- **Command Civilian Award for Valor with Commendation for Courage**, United States Air Force, Aug 2005. *Awarded to me by the USAF for rescuing and using CPR to save the life of a drowning child.*
- **Nominee for US Federal Employee of the Year**, US Air Force, 2005. *Nominated with only 7 others for the prestigious federal employee of the year in the category of science, engineering, medical, and legal professionals.*
- **Civilian of the Quarter**, US Air Force Material Command, Jan 2004. *I won civilian of the quarter in my Center within AFMC for engineers.*
- **STAR Team Award**, US Air Force Office of Scientific Research (AFOSR), 2002. *This team award was given to the Advanced Supercritical Fuels/Combustion group conducting research on aerospace fuels. Eleven names (including me due to my PhD research) in the Air Force Research Laboratory, Propulsion Directorate were awarded as part of this team.*
- **Certificate of Merit**, US Air Force Systems Command (AFSC), 1992. *Awarded due to my work at modeling ballistic missiles in support of US arms reduction treaties.*
- **Notable Achievement Award**, US Air Force, 1990. *Awarded for my innovative efforts in developing digital computer models.*
- **Performance Certificates**, US Air Force, Superior Performance, 2000, 1999, 1992, 1991, 1990

CONSULTANCY

Principal technical aerospace consultant

Independent-X (Malaysian) Google Lunar X-Prize Competition Team

Competing to win \$30+ million US dollars awarded to the first team to land a privately funded rover on the moon.

RESEARCH GRANTS *(led as principal investigator)*

Note: *All of my grants were fully successful in meeting all of their objectives*

- 1) **Development of a Prototype Biomimetic Micro Air Vehicle (BMAV)**, ~RM195,000 (\$49K) - **ScienceFund Grant**, Malaysian Ministry of Science, Technology & Innovation, Grant #: 04-01-03-SF1215, 2017-2020
- 2) **Component Analysis and Integrated Systems Development of a Biomimetic Micro Air Vehicle** **RM 1,001,000** (~\$313K) – **High Impact Research Grant (HIR)**, Malaysian Ministry of Education Grant #: UM.C/625/1/1HIR/MOHE/ENG/53 (H-16001-D000053), 2013 – 2016
- 3) **Analysis and Modeling of Insect Flight Kinematics for Emulation in Biomimetic Micro Air Vehicles** **RM 188,000** (~\$58.8K) – **University of Malaya Research Grant (UMRG)** Grant #: RG155-12AET, 2013 – 2016
- 4) **Numerical and Analytical Study of Compact Hydrogen PEM Fuel Cells** **RM 47,300** (~\$14.8K) – **Fundamental Research Grant Scheme (FRGS)**, Malaysian Ministry of Education Grant #: 600-RMI/ST/FRGS/5/3/Fst (156/2010), 2010 – 2012

- 5) **A New Fuel Cell Powered Aerospace Propulsion System**
RM 242,400 (~\$75.8K) – **ScienceFund Grant**, Malaysian Ministry of Science, Technology & Innovation
 Grant #: 04-01-01-SF0188, 2008 – 2009
- 6) **Physical and Chemical Behavior of Endothermic Jet Fuels**
\$24,750 (~RM 94.0K) – **Dayton Area Graduate Studies Institute (DAGSI) Grant**, United States
 Grant #: F33615-03-2-2347, 2001 – 2003

PUBLICATIONS

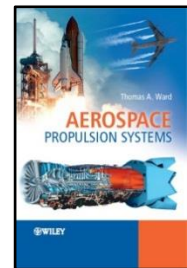
Internationally Published Text Book

- Ward, T., *Aerospace Propulsion Systems*, John Wiley and Sons, Inc., Singapore, 2010, ISBN 978-0-470-82497. (527 pages)

[Note: Being used by undergraduate propulsion courses at universities in Asia and the United States]

Wiley website: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-0470824972.html>

Amazon.com: http://www.amazon.com/Aerospace-Propulsion-Systems-Thomas-Ward/dp/0470824972/ref=sr_1_1?s=books&ie=UTF8&qid=1317095115&sr=1-1



Journal Publications

- (1) Sheikh Khaleduzzaman Shah, Mohammed Mahbubul Islam, M.R. Sohel, Saidur Rahman, J. Selvaraj, T.A. Ward, and M. E. Niza, *Experimental analysis of energy and friction factor for titanium dioxide nanofluid in a water block heat sink*, International Journal of Heat and Mass Transfer, Vol. 115, 2017, pp. 77-85.
- (2) Thomas A. Ward, Christopher J. Fearday, and Erfan Salami, *A Bibliometric Review of Progress in Micro Air Vehicle Research*, International Journal of Micro Air Vehicles, 2017.
- (3) Praveena Nair Sivasankaran, Thomas A. Ward, Erfan Salami, Rubentheren Viyapuri, Christopher J. Fearday, and Mohd Rafie Johan, *An experimental study of the elastic properties of dragonfly-like flapping wings for use in Biomimetic Micro Air Vehicles (BMAV)*, Chinese Journal of Aeronautics, Vol. 30, No. 2, 2017, pp. 726-737.
- (4) Christopher Fearday, Thomas Arthur Ward, Norhayati Soin, Uda Hashim, and Nissar Mohammad Karim, *Development of an inductor incorporated onto a carbon fiber MAV structural component*, Microsystem Technologies, Vol. 23, No. 5, 2017, pp. 1433-1442.
- (5) Praveena N. Sivasankaran, Thomas A. Ward, Rubentheren Viyapuri, and Mohd Rafie Johan, *Static Strength Analysis of Dragonfly Inspired Wings for Biomimetic Micro Air Vehicles*, Chinese Journal of Aeronautics, Vol. 29, No. 2, 2016, pp. 411-423.
- (6) Praveena N. Sivasankaran and Thomas A. Ward, *Spatial network analysis to construct simplified wing structural models for Biomimetic Micro Air Vehicles*, Aerospace Science and Technology, Vol. 49, 2016, pp. 259-268.
- (7) Rubentheren Viyapuri, Thomas A. Ward, Ching Yern Chee, and Praveena N. Sivasankaran, *Effects of heat treatment on chitosan nanocomposite film reinforced with nanocrystalline cellulose and tannic acid*, Carbohydrate Polymers, Vol. 140, 2016, pp. 202-208.
- (8) Zargham, S., Ward, T. A., Ramli R., Badruddin, I. A., *Topology Optimization: A Review for Structural Designs under Vibration Problems*, Structural and Multidisciplinary Optimization, 2016, pp. 1-21. DOI: 10.1007/s00158-015-1370-5
- (9) Ward, T. A., Rezadad, M., Fearday, C. J., and Viyapura, R., *A Review of Biomimetic Air Vehicle Research: 1984-2014*, International Journal of Micro Air Vehicles, Vol. 7, No. 3, 2015, pp. 203-395

- (10) Rubentheren Viyapuri, Ward, T. A., Chee, C. Y., and Praveena N. Sivasankaran, Physical and chemical reinforcement of chitosan film using nanocrystalline cellulose and tannic acid, *Cellulose*, Vol. 22, No. 4, 2015, pp. 2529-2541
- (11) Said, Z., Sabiha, M. A., Saidur R., Hepbasli, A., Rahim, N. A., Mekhilef, S., and Ward T. A., *Performance enhancement of a Flat Plate Solar collector using TiO₂ nanofluid and Polyethylene Glycol dispersant*, *Journal of Cleaner Production*, Vol. 92, 2015, pp. 343-353
- (12) Rubentheren, V., Ward, T. A., Chee, C. Y., and Tang, C. K., *Processing and analysis of chitosan nanocomposites reinforced with chitin whiskers and tannic acid as a crosslinker*, *Carbohydrate Polymers*, Vol. 115, 2015, pp. 379-387.
- (13) A. Wadi Abbas Al-Fatlawi, N.A. Rahim, R. Saidura, and T. A. Ward, *Improving Solar Energy Prediction in Complex Topography Using Artificial Neural Networks : Case study Peninsular Malaysia*, *Environmental Progress and Sustainable Energy*, Vol. 34, No. 5, 2015, pp. 1528-1535.
- (14) Heng L. C., Al-Amin A. Q., Saidur R., and Ward T. A., *Renewable Energy Choice: Cost and Energy Analysis of Grid Connected Photovoltaic System in Malaysia*, *Environmental Progress and Sustainable Energy*, Vol. 33, 2014
- (15) Khaleduzzaman, S. S., Saidur, R., Mahbubul, I. M., Ward, T. A., Sohel, M. R., Shahrul, I. M., Selvaraj, J.; and Rahman, M. M., *Energy, Exergy and Friction Factor Analysis of Nanofluid as a Coolant for Electronics*, *Industrial & Engineering Chemistry Research*, Vol. 53, No. 25, 2014, pp 10512–10518.
- (16) Ali Wadi, A., Saidur, R., Ward, T. A. and Rahim, N. A., *Technical and Economic Analysis of Renewable Energy Powered Stand-alone Pole Street Lights for Remote Area*, *Journal of Environmental Progress and Sustainable Energy*, Vol. 33, No.1, 2013, pp. 283-289.
- (17) N. Jenal, W. Kuntjoro, T. A. Ward, K. I. Sainan, F. Mohamad, *Performance Analysis of Ground-Based Static Test for Hydrogen Fuel Cell Propulsion System*, *Applied Mechanics and Materials*, Vol. 393, 2013, pp. 510-515
- (18) Noor Idayu Mohd Tahir, Wahyu Kuntjoro, and Thomas A. Ward, *Aircraft Performance of Kenyalang Fuel Cell UAV*, *Applied Mechanics and Materials*, 393, 2013, pp. 338-343
- (19) Ali, M. B., Saidur, R., Hasanuzzaman, M., and Ward, T. A., *Energy and Emission Analysis in the Malaysian Food Industries*, *Journal of Environmental Progress and Sustainable Energy*, Vol. 32, No. 3, 2013, pp. 777-783.
- (20) Ward, T., *Common Elements of Capstone Projects in the World's Top-ranked Engineering Universities*, *European Journal of Engineering Education*, Vol. 38, No. 2, 2013, pp. 211-218.
- (21) Ward, T., *Design and Flight Analysis of the Kenyalang-1 Fuel Cell Powered Unmanned Aircraft*, *Journal of Mechanical Engineering*, Vol. 9 (1), 2012
- (22) Ward, T., Ervin, J., Zabarnick, S., and Shafer, L., *Pressure Effects on Flowing Mildly-Cracked n-Decane*, *AIAA Journal of Propulsion and Power*, Vol. 21, No. 2, 2005, pp. 344-355.
- (23) Ward, T., Ervin, J., Striebich, R., and Zabarnick, S., *Two-Dimensional Simulations of Flowing Mildly-Cracked Normal Alkanes Incorporating Proportional Product Distributions*, *AIAA Journal of Propulsion and Power*, Vol. 20, No. 3, 2004, pp. 394-402.
- (24) Ervin, J., Ward, T., Williams, T., and Bento J., *Surface Deposition within Treated and Untreated Stainless Steel Reactors Resulting from Thermal-Oxidative and Pyrolytic Degradation of Jet Fuel*, *Energy and Fuels*, Vol. 17, No. 3, 2003.

Additional Journal Articles (awaiting publication)

- (1) Erfan Salami, Elham Montazer, Thomas A. Ward, and Nik Nazri Nik Ghazali, *Nano-indentation Analysis Comparing Dragonfly-inspired Biomimetic Micro Aerial Vehicle (BMAV) Wings*, *Chinese Journal of Aeronautics*, [Submitted Mar 2018].

- (2) Rubentheren Viyapuri and Thomas A. Ward, *Reinforcement of chitosan based nano-composite film using heat treatment for the wing membrane of biomimetic micro air vehicle (BMAV)*, Carbohydrate Polymers, [Submitted in April 2018]
- (3) Christopher Fearday, Thomas Arthur Ward, Norhayati Soin, Ryan O'hara, Peter Collins, *Use of advanced wing pitching in a flapping wing mechanism for a biomimetic micro air vehicle to enhance lift*, IEEE Transactions on Robotics, [Submitted May 2018]
- (4) Erfan Salami, Elham Montazer, Thomas A. Ward, and Nik Nazri Nik Ghazali, *A Review of Aerodynamic Studies on Dragonfly Flight*, [Not Submitted Yet]
- (5) Rahizar Ramli, Thomas Arthur Ward, Sajjad Zargham, Irfan Anjum Badruddin, *Structural Dynamic Modification of Vibrating Structures Using Topology Optimization*, [Not Submitted Yet]

Conference Paper Publications

- (1) Salami, E., Montazer, E., Ward, T. A., and Ganesan, P. B., Nano-mechanical properties and structural of a 3D-printed biodegradable biomimetic micro air vehicle wing. In Materials Science and Engineering Conference Series, Vol. 210, No. 1, p. 012073, June 2017.
- (2) Salami, E., Ganesan, P. B., Ward, T. A., Viyapura, R., and Romli, F. I., *Design and Mechanical Analysis of a 3D-printed Biodegradable Biomimetic Micro Air Vehicle Wing*, 6th AeroTech Conference, Kuala Lumpur, Malaysia, 8-9 November 2016.
- (3) Montazer, E., Mirzaei, M., Salami, E., Ward, T. A., Romli, E., and Kazi, S. N., *Optimization of a Synthetic Jet Actuator for Flow Control around an Airfoil*, 6th AeroTech Conference, Kuala Lumpur, Malaysia, 8-9 November 2016.
- (4) Praveena N. Sivasankaran, Thomas Arthur Ward, Rubentheren Viyapuri, and Mohd Rafie Johan, *Experimental analysis of artificial dragonfly wings using black graphite and fiberglass for use in Biomimetic Micro Air Vehicles (BMAVs)*. 4th International Conference on Material Science and Engineering Technology, In MATEC Web of Conferences, edited by J. Zhou, and O. Adiguzel, Vol. 30, p. 03001. EDP Sciences, Singapore, 4 Nov 2015.
- (5) Ariff, O. K., Salami, E., Ward T. A., and Romli, F., *Key Parameters of Air Breathing Two-Stroke Combustion Engines for Integration into Small Scale UAVs*, 2015, 53rd AIAA Science and Technology Forum, Kissimmee, FL, USA, 2015, 5-9 Jan 2015.
- (6) Mohd Fakharuzi, M.H.A., Syed Omar, S.M.H., Ward, T.A., Sheng, O.C., Hanapi, S., Sainan, K.I., *Design and testing of inertia dynamometer for prototype fuel cell electric vehicle*. In: International Conference on Automotive Innovation and Green Energy Vehicle (AiGEV) 2014, Kuantan, Pahang, Malaysia, 26-27 Aug 2014
- (7) Syed Omar, S. M. H., Arshad, N.M., Mohd Fakharuzi, M.H.A., T.A. Ward, *Development of an energy efficient driving strategy for a fuel cell vehicle over a fixed distance and average velocity*, 2013 IEEE Conference on Systems, Process & Control (ICSPC); Kuala Lumpur, Malaysia, 13-15 Dec 2013, pp. 117-120
- (8) Sadeghipour, S., Saidur, R., and Ward, T., *Augmentation of Heat Transfer in a Car Radiator by Nanofluid Coolant*, 8th Asia-Oceania Top University League on Engineering (AOTULE) Conference and Workshop, Chulalongkorn University, Bangkok, Thailand, 17-19 Oct 2013
- (9) Jenal, N., Ward, T. A., Kuntjoro, W., Aziz, M. R., David, N. V., *A Study on Propeller Performance of a Fuel Cell Powered Propulsion System*, 2012 IEEE International Conference on Control System, Computing, and Engineering (ICCSCE 2012), Penang, Malaysia, 23-25 Nov 2012, pp. 557-561
- (10) Mohd Fakharuzi, M.H.A., Ward, T., and Atan, R., *Performance Analysis of Different Fuel Cell Lightweight Vehicle Power Configurations While Operating on an Inclined Road*, 3rd International Conference on Fuel Cell and Hydrogen Technology, Kuala Lumpur, Malaysia, 22-23 Nov 2011.
- (11) Ward, T., Weigi, J., *Flight Studies of Hydrogen Fuel Cell Powered Propulsion Systems on an Unmanned Aircraft*, Hydrogen + Fuel Cell Conference 2011, Vancouver, Canada, 15-18 May 2011.

- (12) Ward, T., *Kenyalang-1 Unmanned Aircraft Fuel Cell Powerplant Technology Demonstrator*, International Conference on Advances in Mechanical Engineering (ICAME) 2010, Shah Alam, Malaysia, 2-5 Dec 2010, pp. 443-444.
- (13) Ward, T. and Jenal, Norhisyam, *Design and Initial Flight Tests of a Hydrogen Fuel Cell Powered Unmanned Air Vehicle*, ECS Transactions – 2009 Fuel Cell Seminar and Exposition, Palm Springs, CA USA, Vol. 26, No. 1, 17-19 Nov 2010.
- (14) Ward, T., Ervin, J., Striebich, R., and Zabarnick, S., *Flow and Chemical Kinetics Simulations of Endothermic Fuels*, Proceedings of the 4th ASME/JSME Joint Fluids Engineering Conference, Paper FEDSM2003-45692, Honolulu, HI USA, 6-10 Jul 2003.
- (15) Dounghthip, T., Ervin, J., Ward, T., and Williams, T., *Surface Deposition within Treated and Untreated Stainless-Steel Tubes Resulting from Thermal-Oxidative Degradation of Jet Fuel*, 224th ACS national meeting, Boston, MA USA, Preprints from Pet. Chem. Div., Vol. 47, No. 1, 18-22 Aug 2002.

Postgraduate Dissertation and Thesis

- (1) Ward, T., *Physical and Chemical Behavior of Flowing Endothermic Jet Fuels*, Doctoral Dissertation, Department of Mechanical and Aerospace Engineering, University of Dayton, Dayton, Ohio, USA, 2003. (190 pages) [Sole Authorship]
- (2) Ward, T., *Feasibility Study On: The Use of Aerodynamic Prediction Methods in Determining the Dynamic Stability of Missiles*, Masters of Science Thesis, No. 12 Advanced Systems Engineering Course, Loughborough University and Royal Air Force College Cranwell, 1994. (111 pages) [Sole Authorship]

Research Grant Reports

- Ward, T., *A New Fuel Cell Powered Aerospace Propulsion System*, MOSTI Science fund Grant 04-01-01-SF0188, Institut Pengurusan Penyelidikan, Universiti Teknologi MARA, Shah Alam, Malaysia, 2010. (57 pages)

USAF Publications

- Hundreds of US government classified studies, reports, bulletins, and multimedia presentations.

PATENTS

- 1) *Electromagnetic flapping wing mechanism for a biomimetic micro air vehicle*, Application submitted Sep 2015
- 2) *Chitosan film with nanocrystalline cellulose as a physical reinforcement and tannic acid as a chemical crosslinker*, Application submitted Sep 2015
- 3) *Chitosan Film With Chitin Whiskers As A Physical Reinforcement And Tannic Acid As A Chemical Crosslinker*, Application submitted Sep 2015

ADDITIONAL TRAINING

- ANSYS training (CAD-IT Consultants (M) Sdn Bhd, 2016)
- ANSYS Specialized Modeling (CAD-IT Consultants (M) Sdn Bhd, 2015)
- Simwise 4D software training (Aerosoft Technologies Pte. Ltd, 2014)
- Coventorware software training (FTD Solutions, Sdn Bhd, 2013)
- ISI (Web Of Science) Workshop (UM, 2012)
- ANSYS Computational Fluid Dynamics software (UiTM, 2011)
- *Fuel Cell Fundamentals and Technology* course (Ballard, 2009)
- *Continuous Quality Improvement (CQI)* training (UiTM, 2009-2011)
- *PhD Supervisory* course (UiTM, 2009)
- *Computational Aircraft Design* (Virtual-Tech consulting, 2009)

- *Satellite Toolkit* user and special applications (Analytical Graphics Inc., 2008)
- *PADI Open Water SCUBA certification* (PADI, 2007)
- *Bahasa Melayu 1* course (Language House, 2006)
- *US Department of Defense Acquisition Certification* training – Level 1 (USAF, 2005)
- *Cardiopulmonary Resuscitation (CPR)* course (American Red Cross, 2005)
- *7 Habits of Highly Effective People* course (Franklin Covey, 2004)
- *Matlab/Simulink* user training (USAF, 2003)
- *Total Quality Management (TQM)* course (USAF, 2002)
- *Effective Communications* course (USAF, 2001)
- Leadership Training – 2 year program (USAF, 2000-2001)
- *Advanced Airborne Radar* course (Northrop-Grumman, 2000)
- *Chemical Weapons Convention Agreement Inspector* training (DTRA, 1999)
- *Open Skies Agreement Inspection Certification* training (DTRA, 1998)
- *Advanced Systems Engineering Course – 13 month program* (RAF, 1993-1994)
- *Advanced Electro-optical Sensors Course* (USAF, 1991)
- *Radar Cross-section* course (USAF, 1991)
- Russian language course (USAF, 1991)
- *START/INF Treaty Inspection Certification* course (DTRA, 1991)

POSTGRADUATE STUDENT SUPERVISION

Ph.D. Students

Graduated:

- (1) **Praveena Nair** (UM, graduated 2016); *Structural analysis of Biomimetic Micro Air Vehicle (BMAV) wing frames*
- (2) **Rubentheren Viyapuri** (UM, graduated 2016); *Structural and material analysis of Biomimetic Micro Air Vehicles (BMAV)*

Ongoing:

- (1) **Erfan Salami**, UM PhD student (UM, 2015-present); *Aerodynamic wind-tunnel analysis of Biomimetic Micro Air Vehicles (BMAV)*
- (2) **Christopher J. Fearday** (UM, 2012 – present); *Development of Micro Electromechanical (MEM) devices for Biomimetic Micro Air Vehicles (BMAV)*

MSc (by research) Students

Graduated:

- (1) **Norhisyam Jenal** (UiTM, graduated 2014); *Design and Performance Modeling fo the Hydrogen Proton Exchange Membrane (PEM) Fuel Cell Powered Aircraft*
- (2) **Noor Idayu binti Mohd Tahir** (UiTM, graduated 2017); *Aircraft Design Optimization for a Fuel Cell Powered Aircraft*

Ongoing:

- (1) **Mohd Izmir Bin Yamin** (UM, 2012 – present); *Aerodynamic analysis of insects for Biomimetic Micro Air Vehicles (BMAV)*
- (2) **Syed Mohd Harussani Syed Omar** (UiTM, 2012– present); *Automatic Intelligent Controller on Prototype Fuel Cell Electric Vehicle*
- (3) **Mohd Hadi Anuar Bin Mohd Fakharuzi** (UiTM, 2010– present); *Analysis of a Power Train System for a Prototype Zero Emission Energy Efficient Automobile Design*

MEng (by course work) Students

Graduated:

- (1) **Eng Kok Hoe** (UM, graduated 2014); *The Effect of Different Concentrations of Acetic Acid to Remove Lignin and Hemicellulose from Cellulose in Palm Oil Fruit*

JOURNAL ARTICLE REFEREE

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