ASSISTANT PROFESSOR, SCHOOL OF MECHANICAL ENGINEERING PURDUE UNIVERSITY, WEST LAFAYETTE, IN 47907 PHONE (765) 494 8613 • E-MAIL kariyur@purdue.edu

EDUCATION

PhD	Mechanical and Aerospace Engineering	UC San Diego, 2002
MS	Mechanical and Aerospace Engineering	UC San Diego, 1999
BTech	Mechanical Engineering	Indian Institute of Technology Madras, India, 1996

HONORS AND AWARDS

SAE Power Systems Conference Outstanding Paper Awar	rd 2004
Honeywell Technical Achievement Award	2003
Marquis' Who's Who in America Marquis' Who's Who in the World Marquis' Who's Who in Science Guest seminar—Optimum seeking Invited lecture—Energy management Invited lecture—Sensing for Navigation	2007-present 2008-present 2008-present Varian Semiconductor, January 2009 Lehigh University, Mechanical Eng., 16 April 2010 Texas A&M, Aerospace Eng., April 22 2010
IEEE-CSS Technical Committee on Power Generation	January 2011

SERVICE

Technical Editor	International Journal of Adaptive Control and Signal Processing, 2005-present
Program Committee	Hybrid Systems Computation and Control, Santa Barbara, CA, 2006
Program Committee	American Control Conference, Seattle, WA, 2008
Program Committee	American Control Conference, St. Louis, MO, 2009
NSF Review Panel	2009
DOE Technical Review panels Professional memberships	2009 and 2010 ASME, IEEE, AIAA, Institute of Navigation, SIAM

HIGHLIGHTS — 2 BOOKS, 11 JOURNAL PAPERS, 33 CONFERENCE PAPERS, 9 PATENTS, 19 PUBLISHED APPLICATIONS

PROPOSA	ALS.
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WNSIA, Wireless Network for Secure Industrial Applications	(2002)
 Agency: DOE Contributed to portion on control over wireless sensor networks WON 	
HURT, Heterogeneous Urban Reconnaissance Surveillance Target Acquisition	(2003)
 Agency: DARPA Wrote the control portions of the proposal that Honeywell eventually worked on Tracking a ground vehicle with a UAV 	

PROPOSALS (Continued)		
• Target and task handoffs between UAVs		
• WON		
• The tracking of a ground vehicle by a UAV was essentially implemented as proposed		
NeTS, Networking Technology and Systems	(2004)	
• Agency: NSF		
 Joint proposal with the University of Minnesota (with Profs. Ahmed Tewfik, Zhi Li Zhang) Contributed to part on Dynamic Spectrum Allocation 		
 Accepted — but NOT FUNDED due to change in funding 		
OAV-II, Organic Air Vehicle-II	(2005)	
Agency: DARPA		
 Contributed portion on path planning and collision avoidance that Honeywell eventually worked WON 	l on	
OTHER		
• INTRODUCING ENERGY METHODS INTO BIOLOGY (PRF)	(2009)	
SMART GRID CONTROLLERS (HONEYWELL ACS) (FAL	L 2010)	
• SELF-CALIBRATING GYRO (THORNBERRY LLC) (SPRIN	G 2011)	
• PREDICTION MODEL FOR GRID POWER CONSUMPTION (AMERICAN ELECTRIC POWER)		
(Sprin	G 2011)	

RESEARCH EXPERIENCE

Facility Energy Management

- Determining the sweet spots for renewable energy sources through combining financial instruments with real time energy management and local power sources.
- Find out optimal deployment strategies for renewable sources to minimize grid transients

Sensors for Navigation

- Obtain orientation and position measurements without GPS or gyroscopes—use only magnetometers, cameras for sun angle, and accelerometers for the g-vector.
- Rigorous techniques for LIDAR-based scene recognition and relative navigation

Energy Methods in Biology

- Develop dynamic models for physiological energy consumption, and use them in conjunction with non-invasive sensing to obtain inexpensive diagnostics, and in future for predictions and cure.
- Testing with instrumented human on a treadmill to check if the fatigue threshold can be predicted on average. Won PRF award funding 1 student for 1 year.

(Purdue, January 2009 – present)

(Purdue, August 2008 – present)

(Purdue, October 2008 – present)

RESEARCH EXPERIENCE (Continued)

Security Systems

(Purdue, March 2009 - present)

- Determined the Nash equilibrium in a security game for both the defense and the criminals in the case of N layers of security and M criminals in collusion.
- Also found optimal randomization and feedback strategies for security system settings to minimize breaches.
- Collaboration with Lockheed Martin San Diego

Personal Navigation (Honeywell Intl. Inc., October 2007 – present)

- Project funded by Honeywell Aerospace GPS denied navigation for first responders and soldiers
- Detection of motion modes (e.g., walking, crawling) and stride models for pedometry in those modes

Quantum Control

(Honeywell Intl. Inc., October 2007 - December 2007)

- Project funded by Honeywell Aerospace survey for sensing applications of quantum effects/control
- Discovered two major possible research directions stabilizing known phenomena across wider temperature range and discovering potential functions that would permit analytic solutions to the governing equations

Analysis and Design of GPS Receivers (Honeywell Intl. Inc., March 2006 – present)

- Project funded by Honeywell Aerospace Analysis and Synthesis for avionics GPS receivers
- Stability and performance analysis of GPS tracking loops
- Design of GPS software defined receiver for the L5 signal

GPS Denied Navigation

(Honeywell Intl. Inc., January 2006 - present)

- Project funded by Honeywell Aerospace ensuring GPS-like accuracy without GPS availability
- Estimating rotation and translation from stereo vision through maximum likelihood methods
- Analysis of the benefit of adding the inputs of various sensors to the navigation system (e.g., radar, lidar)

USUKITA

(Honeywell Intl. Inc., November 2006 - May 2007)

- Project funded by US DoD and UK MoD theory for wireless networks
- Optimization theoretic framework for practical network capacity bounds

Distributed Intelligence Technology (Honeywell Intl. Inc., January 2006 - March 2007)

- Project funded by Honeywell ACS integrating sensors into a wireless surveillance network
- Built upon results form real-time camera tracking to make higher level wireless bandwidth allocation feasible

Real Time Surveillance (Hone

(Honeywell Intl. Inc., February 2005 - December 2005)

- Project funded by Honeywell Security designing autonomous target tracking with Pan-Tilt-Zoom cameras
- Decentralized control and handoff system designed
 - Nonlinear control laws with global exponential tracking except in a small region near the camera
 - o Novel use of a rangefinder (ultrasonic or laser) in conjunction with cameras

RESEARCH EXPERIENCE (Continued)

Path Planning(Honeywell Intl. Inc., October 2005 – December 2005)

- Project funded Honeywell Aerospace analysis of path planning methods
- Determined limits of various methods and developed efficient implementation of Laplacian path planning
- Laplacian Path Planning used in DARPA OAV-II demonstration

DARPA SEC, Software Enabled Control (November 2004 – May 2005, Honeywell Intl. Inc.)

- Project funded by DARPA multi-UAV coordinated mission control and autonomous target tracking
- Mission objectives: Persistent surveillance, autonomous target tracking and handoff, eyes on target request
 - o Discretization of urban battle space using planar Voronoi diagrams at different altitudes
 - Using vehicle navigation limits to determine traversable graphs
 - One dimensional optimal control of UAVs on the graphs to give traverse times
 - o Mixed Integer Linear Programs to solve for vehicle resource allocation

Local Area Augmentation System (October 2004 – December 2005, Honeywell Intl. Inc.)

- Project funded by the FAA providing GPS corrections to landing aircraft
- Worked on Health Monitoring for the LAAS receivers
- Set thresholds (based on probability distributions with dimension up to 30) based on false detection rate
 - Will be used on LAAS systems worldwide

Analysis of Health Monitoring in Gas Turbine Engines (September 2004 – December 2004, Honeywell Intl. Inc.)

- Project funded by Honeywell Engines cost benefit analysis of health monitoring on Gas Turbine engines
- Determined limits to monitoring benefits based on sensor reliability

Stabilization and Safety Verification of Hybrid Systems (January 2003 – January 2005, Honeywell Intl. Inc.)

- Project funded by NASA Ames designing control laws and verifying safety of the resulting system
- Control synthesis and verification done for a NASA life support system

Wireless Datalink Maximization (Honeywell Intl. Inc., October 2003 – December 2003)

- Positioning autonomous vehicles to maximize the wireless datalink between them
- Involved simulation test-bed with two ray model and design of stable dynamic optimization

Obstacle Avoidance via Radar Feedback (Honeywell Intl. Inc., June 2003 – August 2003)

• Simple feedback laws for real-time avoidance of unmapped obstacles by unmanned vehicles

RESEARCH EXPERIENCE (Continued)

- (Honeywell Intl. Inc., November 2002 May 2003) Aerodynamic Modeling
- Development of modified lifting line theory for prediction of dynamic ground effect for fixed-wing • aircraft

Predictive Trend Monitoring (Honeywell Intl. Inc., September 2002 – December 2003)

- Fault prediction via statistical trending for gas turbine engines Patent filed
- Statistical characterization of parameter trends, and determination of thresholds for faults and degradation rates
- Being used on Honeywell Auxiliary Power Units in thousands of airplanes around the world

Adaptive Filtering

- Development, testing and implementation of adaptive filtering algorithms Patents filed
- Currently in use in all CDMA chipsets sold around the world •

Pulsed Detonation Engines

Regulation of equivalence ratio profiles in pulsed detonation engines in a cold-flow experiment

Compressor Instability Control

• Near-optimal stable operation of deep-hysteresis aeroengine compressors under large disturbances

Control of Formation Flight

Helicopter Noise Control

Extremum seeking control for optimizing the position of the trailing aircraft in formation flight for minimum power demand. The design is robust to existing plant nonlinearities, and allows rapid convergence of the trailing aircraft position to an optimal position in the upwash field of the leading aircraft, promising significant saving of fuel consumption (up to 20%)

Multiparameter Extremum Seeking and Slope Seeking (UC San Diego, 1999-2000)

- Development of a linear SISO stability test for multiparameter extremum seeking (the method involves online extremization of a plant output with respect to its inputs through feedback)
- Derivation of systematic design guidelines to satisfy the stability test
- Development of *slope seeking*, a new adaptive control technique that allows a plant to operate at a certain • slope of its input-output map. The results include a rigorous design algorithm with stability and performance guarantees

Combustion Instability Control (UC San Diego; United Technologies Research Center (UTRC), East Hartford, CT, 1998)

- Model validation for UTRC combustor models using experimental data
- Participation in UTRC efforts in extremum seeking control of combustion instabilities
- Development of an averaged model for thermoacoustic instabilities in a gas turbine combustor, and its identification from experiments
- Nonlinear identification of combustion dynamics from experimental data

(University of Maryland, College Park, 1997)

• Active control of blade vortex interaction noise on a helicopter blade element - Problem formulation, design of feedback controls for noise attenuation, and development of an adaptive scheme for noise cancellation, with proof of stability by the method of averaging and testing through simulation

(UC San Diego, 2002)

(UC San Diego, 2002)



(UC San Diego, 2001)

(Qualcomm Inc., September 2001-August 2002)

PUBLICATIONS

Books

- 1. "Hierarchical TRIZ Algorithms," Larry Ball, Kartik B. Ariyur and Paul Dwyer, 3mpub.com, 2007.
- 2. "Real-Time Optimization by Extremum Seeking Control," K. B. Ariyur and M. Krstic, John Wiley & Sons, NY, October 2003.

Book Chapters

1. "Wikinomics Playbook," recognized as one of the principal contributors in this mass effort at mass collaboration organized by the authors of Wikinomics, <u>http://www.socialtext.net/data/workspaces/wikinomics/attachments/wikinomics:20080213154459-1-3411/original/the%20wikinomics%20playbook%2002%202008.pdf</u> 2008.

Journal Articles

- 1. "Stabilizing the Smart Grid: Solutions for Supply-Demand Imbalances," Q. Luo, K. B. Ariyur, and A. K. Mathur, submitted to *Energy Economics*, January 2011.
- 2. "Navigation with Natural Signals: Potential, Results and Challenges," I. A. G. Laureyns, G. Sharma, and K. B. Ariyur, submitted to the Journal *Navigation*, October 2010.
- *3.* "UAVs and Control," K. O. C. Fregene, K. A. Wise, and K. B. Ariyur, submitted to the special issue of the *IEEE Control Systems Magazine* on UAV control, August 2010.
- 4. "<u>A Nonlinear Hybrid Life Support System: Dynamic Modeling, Control Design, and Safety Verification</u>," S. Glavaski, D. Subramanian, K. B. Ariyur, R. Ghosh, N. Lamba, A. Papachristodoulou, *IEEE Transactions on Control System Technology*, vol. 15, pp. 1003-1017, 2007.
- "<u>An Adaptive Algorithm for Control of Combustion Instability</u>", A. Banaszuk, K. B. Ariyur, M. Krstic, C. A. Jacobson, *Automatica*, vol. 14, pp. 1965-1972, 2004.
- 6. "<u>Slope Seeking: A Generalization of Extremum Seeking</u>," K. B. Ariyur and M. Krstic, International *Journal of Adaptive Control and Signal Processing*, vol. 18, pp. 1-22, 2004.
- 7. "<u>Aeroengine Prognostics via Local Linear Smoothing, Filtering and Prediction</u>, " K. B. Ariyur and J. Jelinek, *SAE Transactions, Journal of Aerospace*, vol. 113, pp. 1773-1780, 2004.
- "<u>Tailored Fuel Injection for Pulsed Detonation Engines via Feedback Control</u>," A. Aliseda, K. B. Ariyur, O. Sarrazin, J. C. Lasheras, M. Krstic, *ALAA Journal of Propulsion and Power*, vol. 19, pp. 917-921, 2003.
- 9. "Formation Flight Optimization using Extremum Seeking Feedback", P. Binetti, K. B. Ariyur, M. Krstic, F. Bernelli, ALAA Journal on Guidance, Control and Dynamics, vol. 26, pp. 132-142, 2003.
- 10. "Extremum Seeking Control for Discrete-Time Systems," J. Y. Choi, M. Krstic, K. B. Ariyur, J. S. Lee, IEEE Transactions on Automatic Control, vol. 47, pp. 318-323, 2002.
- 11. "Feedback Attenuation and Adaptive Cancellation of Blade Vortex Interaction on a Helicopter Blade Element", K. B. Ariyur and M. Krstic, *IEEE Trans. Control System Technology*, vol. 7, pp. 596-605, 1999.

Conference Papers

- 1. "A framework to quantify security strategies and associated complexity," Rajdeep Singh and Kartik B. Ariyur, submitted to the *2011 American Control Conference*, San Francisco, CA, June 29—July1, 2011.
- "On the Extremum Seeking of Model Reference Adaptive Control in Higher Dimensional Systems," P. Haghi and K. B. Ariyur, submitted to the 2011 American Control Conference, San Francisco, CA, June 29—July1, 2011.

- 3. "Bounding Inertial Drift in Personal Navigation with Gait Dynamics," Y. Cui and K. B. Ariyur, to appear in the *Proceedings of the IEEE International Systems Conference (SysCon 2011)*, Montreal, Quebec, Canada, April 3-6, 2011.
- 4. "Robustness for Large Scale UAV Autonomous Operations,"S.-H. Jung and K. B. Ariyur, to appear in the *Proceedings of the IEEE International Systems Conference (SysCon 2011)*, Montreal, Quebec, Canada, April 3–6, 2011.
- 5. "A Mathematical Foundation for TRIZ Methods," K. B. Ariyur, to appear in the *Proceedings of the IEEE International Systems Conference (SysCon 2011)*, Montreal, Quebec, Canada, April 3–6, 2011.
- 6. "Scalable Autonomy for Unmanned Aerial Vehicles," S.-H. Jung and K. B. Ariyur, to appear in the *Proceedings of the ALAA Infotech@Aerospace 2011(Unleashing Unmanned systems)*, St. Louis, MO, March 29–31, 2011.
- "Properties of Laplacian Path Planning for UAVs," F. Yang and K. B. Ariyur, to appear in the Proceedings of the ALAA Infotech@Aerospace 2011(Unleashing Unmanned systems), St. Louis, MO, March 29– 31, 2011.
- 8. "Deception Robust Control for Automated Cyber Defense Resource Allocation," J. Lawson, R. Singh, M. Hultner, and K. B. Ariyur, to appear in the *Proceedings of the IEEE Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA)*, Miami Beach, FL, February 22–24, 2011.
- 9. "Accelerometer Based Inertial Measurement Units," P. Gullipalli and K. B. Ariyur, to appear in the *Proceedings of the ION International Technical Meeting*, San Diego, CA, January 24-26, 2011.
- "The Safety of Autonomous Ground Vehicles as a Function of Sensing Capability," K. B. Ariyur and M. Mishra, to appear in the *Proceedings of the ION International Technical Meeting*, San Diego, CA, January 24—26, 2011.
- 11. "Coalescence constraints for inkjet print mask optimization," J. William Boley, Kartik B. Ariyur, and George T-C. Chiu, P *Proceedings of the 2010 IEEE-ASME Conference on Advanced Intelligent Mechatronics*, Montreal, Canada, July 6-9, 2010.
- 12. "Building thermal network model and application to temperature regulation," Qi Luo and Kartik B. Ariyur, *Proceedings of the 2010 IEEE Multi-conference on Systems and Control,* Yokohama, Japan, September 8-10, 2010.
- 13. "Motion estimation and navigational drift correction with LIDAR data," *ION International Technical Meeting*, San Diego CA, January 25-27, 2010.
- 14. "Direct orientation and position measurements via magnetometers for miniature autonomous systems, " Isabelle A. G. Laureyns, Gautam Sharma, and Kartik B. Ariyur, GNC Challenges for Miniature Autonomous Systems Workshop, Fort Walton Beach, FL, October 26-28, 2009.
- 15. "The use of natural signals for localization and navigation with application to centimeter sized UAVs," Gautam Sharma, Isabelle A. G. Laureyns, and Kartik B. Ariyur, to appear in the *Proceedings of the 2010 American Control Conference*, Baltimore, MD, June 30-July 2, 2010.
- 16. "Extremum seeking for model reference adaptive control," Kartik B. Ariyur, Subhabrata Ganguli, and Dale F. Enns, *Proceedings of the ALAA Conference on Guidance, Control and Dynamics, Chicago, IL, August 10–13, 2009.*
- 17. "Region of attraction with performance bounds," Subhabrata Ganguli, Kartik B. Ariyur, and Dale F. Enns, *Proceedings of the ALAA Conference on Guidance, Control and Dynamics, Chicago, IL, August 10–13, 2009.*
- 18. "<u>Real-time energy management: cutting energy costs and the carbon footprint</u>," Qi Luo, Kartik B. Ariyur, and Anoop K. Mathur, *Proceedings of the 2009 ASME Dynamic Systems and Control Conference*, Hollywood CA, October 12-14, 2009.
- 19. "<u>Analytic framework and QoS adaptive mechanisms for achieving transport capacity bounds in multihop statically routed IEEE 802.11 networks</u>," S. Varadarajan, Y. Yi, K. B. Ariyur, *Annual Conference of ITA*, Adelphi, MD, September 2007.
- 20. "Safety Verification of Controlled Advanced Life Support System using Barrier Certificates," S. Glavaski, A. Papachristidoulou, K. B. Ariyur, *In Hybrid Systems: Computation and Control*, LNCS 3414, pp. 306-321, Springer-Verlag, 2005.

- 21. "Reactive inflight obstacle avoidance via radar feedback," K. B. Ariyur, P. H. Lommel, D. F. Enns, *Proceedings of the 2005 American Control Conference*, pp. 2978-2982, Portland, Oregon, June 2005.
- 22. "Prediction of dynamic ground effect through modified lifting line theory," K. B. Ariyur, AIAA 2005-4610, Proceedings of the 23rd AIAA Applied Aerodynamics Conference, Toronto, Ontario, Canada, June 2005.
- "Control Design for a Hybrid Dynamical System: A NASA Life Support System," D. Subramanian, K. B. Ariyur, N. Lamba, R. Deshpande, and S. Glavaski, *In Hybrid Systems: Computation and Control*, LNCS 2293, pp. 570-584, Springer-Verlag, 2004.
- 24. "Slope Seeking and Application to Compressor Instability Control", K. B. Ariyur and M. Krstic, 2002 IEEE Conference on Decision and Control, pp. 3690-3697, Las Vegas, NV, Dec. 2002.
- 25. "Slope Seeking in Equilibrium Maps of Nonlinear Systems," K. B. Ariyur and M. Krstic, *Asian Control Conference*, Singapore, Sept. 2002.
- 26. "Multivariable Extremum Seeking Feedback: Analysis and Design," K. B. Ariyur and M. Krstic, *Mathematical Theory of Networks and Systems*, South Bend, IN, Aug. 2002.
- 27. "Control of Formation Flight via Extremum Seeking," P. Binetti, K. B. Ariyur, M. Krstic, F. Bernelli, 2002 American Control Conference, pp. 2848-2853, Anchorage, AK, May 2002.
- 28. "Analysis and Design of Multivariable Extremum Seeking," K. B. Ariyur and M. Krstic, 2002 American Control Conference, pp. 2903-2908, Anchorage, AK, May 2002.
- "Stability of Extremum Seeking Control for a Class of Discrete-Time Systems," J. Y. Choi, M. Krstic, K. B. Ariyur, J. S. Lee, 40th IEEE Conference on Decision and Control, pp. 1717-1722, Tampa, FL, Dec. 2001.
- 30. "Tuning of a Combustion Controller by Extremum Seeking: A Simulation Study," G. Schneider, K. B. Ariyur, M. Krstic, *Conference on Decision and Control*, pp. 5219-5223, Sydney, Australia, Dec. 2000.
- 31. "Identification of Averaged Dynamics of a Controlled Combustion Instability," K. B. Ariyur, A. Banaszuk, M. Krstic, *Conference on Decision and Control*, pp. 2017-2022, Sydney, Australia, Dec. 2000.
- 32. "A Case Study of Performance Improvement in Extremum Seeking Control," E. Elong, M. Krstic, K. B. Ariyur, *American Control Conference*, pp. 428-432, Chicago, IL, Jun. 2000.
- 33. "Active Control of Blade Vortex Interaction Noise on a Helicopter Blade Element," K. B. Ariyur and M. Krstic, *Proceedings of the SPIE Conference on Mathematics and Control in Smart Structures*, pp. 1053-1057, San Diego, CA, Mar. 1998.

GRADUATE COURSEWORK

Linear Control Theory, Covariance Control, Optimal Control, Nonlinear Control, Robust and Adaptive Control, Distributed Parameter Systems Control, Fluid Mechanics, Hydrodynamic Stability, Helicopter Aerodynamics, Smart Structures, Theoretical Mechanics, Dynamical Systems Theory, Nonlinear Analysis, Real Analysis, Functional Analysis, Partial Differential Equations.

TEACHING EXPERIENCE

Instructor	ME365—Measurement Systems	Purdue University	Fall-2008—present
Class Instructor (40 hrs)	TRIZ - Creativity as an exact science	Honeywell	2003-2007
Guest lecturer	Adaptive Control (MAE 282)	UC San Diego	Spring 2001
Grader	Nonlinear Systems (MAE 281A)	UC San Diego	Spring 2001
Teaching Assistant	Automatic Control (ENME403)	University of Maryla	nd Fall 1996

LEADERSHIP EXPERIENCE

MAE Graduate Student Association	UC San Diego	2000 - 2001	Vice-president
ME Class	IIT Madras, India	1994 — 1996	Representative

OTHER SERVICES

Mentoring

- PhD advisor—Priyank Gullipalli, Sung-Hun Jung, Qi Luo, Fei Yang, Poorya Haghi, Isabelle Laureyns,
- MS advisor—Isabelle Laureyns, Gautam Sharma, Mayank Mishra, Yu-Feng Hung, Sung-Hun Jung, Yan Cui, , John Barnes
- Undergraduate research—Raymond Sutjiono, Peyton Lee, Garrett Baker, Fady Megalli, Ajinkya Shirude, Rohan Handa, Xuefeng Wang, Wujun Mu.
- Graduate students (visiting UCSD, 1999-2001) Ernest Elong (Cameroon), Georg Schneider (Germany), Joon-Young Choi (S. Korea), Paolo Binetti (Italy)
- Undergraduates (Univ. of Minnesota) two students per year, 2002 through 2007
- Project mentoring at Honeywell
 - Helping project teams with TRIZ analysis to quickly obtain multiple conceptual solutions
 - Fire Sensing
 - APU starter motor program

Reviewer

- IEEE Transactions on Automatic Control
- IEEE Transactions on Control Systems Technology
- IEEE Control Systems Magazine
- Combustion and Flame
- International Journal of Adaptive Control and Signal Processing
- Journal of Intelligent Material Systems and Structures
- AIAA Journal of Propulsion and Power
- AIAA Journal of Guidance, Control, and Dynamics
- ASME Journal of Dynamic Systems, Measurement, and Control
- SIAM Journal of Control and Optimization
- IEEE Transactions on Biomedical Engineering
- ASME Journal of Solar energy Engineering
- IEEE Transactions on Robotics
- IEEE Transactions on Systems, Man, and Cybernetics
- Mathematical Modelling of Systems
- ASME/AIAA/IEEE/ION Conferences

Honeywell focus group on change management

Investigated means for improving engineering employee retention and made recommendations that were successfully implemented

Honeywell Problem Solving Wiki

Created a wiki for engineers from around the world to pose problems and tap global pool of expertise. Problem posing in TRIZ format.

The Selection of Research Problems

Qualitative and quantitative tools to help the Honeywell Strategy Research Group Use of real options and impulse optimal control to enhance research portfolio performance

PATENTS

Issued

- "Method and system for autonomous tracking of a mobile target by an unmanned aerial vehicle," K. B. Ariyur and K. O. C. Fregene, US Patent No. 7765062, July 27, 2010.
- "<u>Real time planning and scheduling for a team of unmanned vehicles</u>," K. B. Ariyur, D. P. Johnson, D. Subramanian, US Patent No. 7603212, October 13, 2009.
- 3. "<u>System and method to perform stable distributed power control in a wireless network</u>," K. B. Ariyur, US Patent No. 7603136, October 13, 2009.
- 4. "<u>Trending system and method using window filtering</u>," K. B. Ariyur and J. Jelinek, US Patent No. 7580812, August 25, 2009.
- 5. "Tracking a moving object from a camera on a moving platform," K. B. Ariyur, S. J. Bedros, V. Morellas, US Patent No. 7541565, June 2, 2009.
- 6. "<u>Trending System</u>", K. B. Ariyur, US Patent No. 7474992, January 6, 2009.
- 7. "Method for optimizing wireless data link capacity between mobile vehicles," K. B. Ariyur, S. S. Kazi, and C. Bommalingaiahnapallya, US Patent No. 7457619, November 25, 2008.
- 8. "Tracking a moving object from a camera on a moving platform," K. B. Ariyur, S. J. Bedros, V. Morellas, US Patent No. 7411167, August 12, 2008.
- 9. "<u>Pilot Estimation using prediction error method switched filters</u>," F. Abrishamkar, K. B. Ariyur, and K. Kreutz-Delgado, US Patent No. 7061882 B2, 13 June 2006.

Published Applications

- 10. "System and method for simultaneous localization and map building," V. L. Bageshwar and K. B. Ariyur, USPTO Publication No. 20100280699, November 4, 2010.
- 11. "Method for collision avoidance of unmanned vehicle with other aircraft," K. B. Ariyur, M. R. Elgersma, USPTO Publication No. 20100121574, May 13, 2010.
- 12. "Method and system for optimizing wireless networks through feedback and adaptation," K. B. Ariyur, S. Varadarajan, and Y. Yi, USPTO Publication No. 20090303888, December 10, 2009.
- 13. "Method to operate a wireless network having a predictable and stable performance," K. B. Ariyur, Y. Yi, and S. Varadarajan, USPTO Publication No. 20090245262, October 1, 2009.
- "Method and device for three-dimensional path planning to avoid obstacles using multiple planes," K. B. Ariyur, E. Lautenschlager, and M. R. Elgersma, USPTO Publication No. 20090228205, September 10, 2009.
- 15. "System and method for GNSS position aided signal acquisition," B. Schipper and K. B. Ariyur, USPTO Publication No. 20090207076, August 20, 2009.
- 16. "Method and system for performing distributed outer loop power control in wireless communication networks," K. B. Ariyur, USPTO Publication No. 20090093267, April 9. 2009.
- "Method and system for automatic path planning and obstacle/collision avoidance of autonomous vehicles," M. R. Elgersma, S. Dajani-Brown, K. O. C. Fregene, S. Pratt, K. B. Ariyur, USPTO Publication No. 20090088916, April 2, 2009.
- 18. "Method for adjusting power at a node," K. B. Ariyur, USPTO Publication No. 20090052371, February 26, 2009.
- 19. "High fidelity target identification and acquisition through image stabilization and image size regulation," K. B. Ariyur, V. Morellas, S. J. Bedros, USPTO Publication No. 20080118104, May 22, 2008.
- "Method and system for detection and remediation of sensor degradation in a monitoring device," K. O. C. Fregene, K. B. Ariyur, USPTO Publication No. 20080046213, February 21, 2008.

- 21. "<u>Static camera tracking system</u>," K. B. Ariyur, S. Bedros, D. W. Strelow, V. Morellas, USPTO Publication No. 20070286456, December 13, 2007.
- 22. "<u>Wireless sensor network with superconducting nodes</u>," K. B. Ariyur, A. K. Mathur, USPTO Publication No. 20070249503, October 25, 2007.
- 23. "<u>A calibration system</u>," K. B. Ariyur, A. K. Mathur, USPTO Publication No. 20070107487, May 17, 2007.
- 24. "<u>Controller for a life support system</u>," K. B. Ariyur, R. Ghosh, S. Glavaski-Radovanovic, N. Lamba, D. Subramanian, USPTO Publication No. 20060278753, December 14, 2006.
- 25. "<u>Map based trajectory generation</u>," K. B. Ariyur, D. Subramanian, USPTO Publication No. 20060235610, October 19, 2006.
- 26. "Signal processing with certain materials," K. B. Ariyur, USPTO Publication No. 20060160497, July 20, 2006.
- 27. "<u>Collision avoidance involving radar feedback</u>," K. B. Ariyur, P. Lommel, D. F. Enns, USPTO Publication No. 20060058931, March16, 2006.
- 28. "<u>Prediction of dynamic ground effect forces for fixed wing aircraft</u>," K. B. Ariyur, USPTO Publication no. 20050197811, September 8, 2005.