

Anton H.J. de Ruiter

CONTACT INFORMATION

Department of Aerospace Engineering
Ryerson University
Toronto, ON, Canada

Voice: (416) 979-5000 ext. 4878
Fax: (416) 979-5056
E-mail: aderuiter@ryerson.ca

RESEARCH INTERESTS

Guidance, navigation, control and dynamics of aerospace systems, including fixed-wing and multi-rotor unmanned aerial systems, spacecraft and rovers; control theory; state estimation theory.

ACADEMIC EXPERIENCE

March 2015 - Present

Associate Professor
Department of Aerospace Engineering
Ryerson University, Toronto, ON, Canada

September 2012 - March 2015

Assistant Professor
Department of Aerospace Engineering
Ryerson University, Toronto, ON, Canada
Upon joining Ryerson University, I have been involved in the curriculum redevelopment for the spacecraft stream of the undergraduate aerospace engineering degree. In particular, I redeveloped the entire curriculum for AER 723 Introduction to Spacecraft Systems Design.

September 2012 - June 2015

Adjunct Research Professor
Department of Mechanical and Aerospace Engineering
Carleton University, Ottawa, ON, Canada

January 2009 - August 2012

Assistant Professor
Department of Mechanical and Aerospace Engineering
Carleton University, Ottawa, ON, Canada
Upon joining Carleton University, I was involved in the curriculum development for the new space systems stream within the undergraduate aerospace engineering degree. In particular, I developed two new courses, namely AERO 3240 Orbital Mechanics and AERO 4540 Spacecraft Dynamics and Control. I earned the highest student teaching evaluation in the Department of Mechanical and Aerospace Engineering every time I taught AERO 3240 Orbital Mechanics. I co-authored a book based on the material developed for those two courses.

February 2006 - November 2008

Visiting Research Fellow
Space Technologies Branch
Canadian Space Agency, St-Hubert, QC, Canada
I was involved in a joint Canadian/Japanese spacecraft formation-flying mission design (called JC2Sat-FF), consisting of two nano-satellites in low-Earth orbit, with differential drag as the only means for formation control. I performed the design of the attitude control system for both spacecraft, developing novel fault-tolerant bias-momentum and spin-stabilization control laws using primarily magnetic actuation. I also designed the relative navigation system, developing novel techniques for precise relative navigation of spacecraft using differential GPS. During my time at the CSA, I also performed investigations into different indoor GPS-like positioning techniques.

September 1999 - June 2005

Research Assistant

Institute for Aerospace Studies
University of Toronto, Toronto, ON, Canada

September 1999 - May 2002

Teaching Assistant

Institute for Aerospace Studies
University of Toronto, Toronto, ON, Canada

EDUCATION

University of Toronto, Toronto, Ontario, Canada

Ph.D., Aerospace Engineering, June 2005

- Thesis Title: “Integrated Multi-Objective Control Design Methodologies - with applications to flight control”
- Supervisor: Hugh H.T. Liu

This work addressed the control system design for systems made up of a number of subsystems, each of which may have its own control system, and a number of specifications that must be met simultaneously when all subsystems are integrated. Techniques were developed for partially automating both continuous and discrete time control designs for such systems, with a wide variety of performance specifications and constraints. These techniques were implemented successfully in simulation on an aircraft integrated flight/propulsion system, and in hardware on a laboratory three-degree of freedom helicopter testbed.

M.A.Sc., Aerospace Engineering, November 2001

- Thesis title: “Nonlinear State-Estimation for Spacecraft Attitude Determination”
- Supervisor: Christopher J. Damaren

University of Canterbury, Christchurch, New Zealand

B.E.(Hons), Mechanical Engineering, 23 April 1999

- Final Year Project: “Active Bandsaw Vibration Control Using Force Controlled Guides”
- Supervisor: Christopher J. Damaren

HONORS AND AWARDS

Canada Research Chair (Tier 2) in Spacecraft Dynamics and Control 2016-2020

NSERC Visiting Fellowship in a Government Laboratory, 2006-2008

G. N. Patterson Award Winner, 2005 (UTIAS Award for Excellent Achievement in a Ph.D. Program)

Etkin Medal Winner, 2005 (UTIAS Award for Excellence in Flight Mechanics)

University of Toronto Open Fellowship, 1999-2005

University of Canterbury Doctoral Scholarship, 1999

Best Final Year Project Presentation, Dept. of Mech. Engineering, University of Canterbury, 1998

University of Canterbury Senior Scholarship, 1998

Vibration Association of New Zealand Prize, University of Canterbury, 1998

IEE Prize in Manufacturing, Dept. of Mechanical Engineering, University of Canterbury, 1997

Ian McMillan Prize, School of Engineering, University of Canterbury, 1997-1998

Vickerman Engineering Award, Victoria University of Wellington, 1996

COURSES TAUGHT AT RYERSON UNIVERSITY

AE 8137 Advanced Systems Control

Winter 2015

This is a graduate-level course providing an introduction to advanced control systems techniques. Topics include state-space representation of a system, controllability, observability, observer-based

control design, linear quadratic regulator, robust servomechanism problem, nonlinear system analysis, linearization, Lyapunov methods, LaSalle invariance principle, feedback linearization.

AER 821 Spacecraft Attitude Dynamics and Control

Winter 2014, Winter 2015

This is a fourth-year undergraduate course, covering the fundamentals of spacecraft attitude dynamics and control. Topics include vectors, reference frames, rigid body dynamics, passive attitude stabilization techniques, classical and modern attitude control of spacecraft.

AER 723 Introduction to Space Systems Design

Fall 2013, Fall 2014, Fall 2015

I redeveloped the curriculum for this course based on curriculum changes to the Spacecraft Stream in the undergraduate aerospace engineering degree. This has brought the course into line with what is being taught in similar courses at other universities.

This is a fourth-year undergraduate course, providing an introduction to different aspects of space systems design, including reference frames and time systems, mission analysis, spacecraft propulsion systems and launch, attitude control, space environment, structures, thermal design, power systems, communications.

AE 8143 Avionics

Winter 2013, Fall 2013

This is a graduate-level course providing an introduction to avionics navigation systems, treating the fundamentals of navigation for terrestrial vehicles such as land vehicles, ships and aircraft. The topics covered include reference frames for terrestrial navigation and a model of the Earth, inertial navigation systems and error analysis, inertial sensor error models, navigation aids, sensor fusion using least-squares estimation and Kalman filtering.

AER 715 Avionics and Systems

Fall 2012

This is a fourth-year undergraduate course, covering the fundamentals of avionics and aircraft systems, including avionics systems framework and design, instrument and crew-plane interface, displays and man-machine interaction, sensors, flight control systems including fly-by-wire control, environmental and engine control systems, electrical power systems, fuel and hydraulic systems.

COURSES TAUGHT
AT CARLETON
UNIVERSITY

AERO 4540 Spacecraft Dynamics and Control

Fall 2010, Fall 2011

This was a brand new course at Carleton University in 2010, introduced for the new space stream in the undergraduate Aerospace program. I developed the entire curriculum for this course. A unique aspect of this course is that it simultaneously teaches both classical control and spacecraft dynamics and control, without any need for prior background in either subject. This was accomplished, by motivating all classical control concepts with a spacecraft attitude control application, which was a physical system that the students could visualize. Student feedback, as well as their high final marks showed that this approach was very successful.

This is a fourth-year undergraduate course, covering the fundamentals of classical control and spacecraft dynamics and control. Topics include: spacecraft attitude dynamics, disturbance torques, passive stabilization techniques - spin, dual-spin and gravity-gradient, active attitude stabilization techniques (three-axis and bias momentum) using classical control - Routh stability criterion, root-locus techniques, frequency response techniques (both Bode and Nyquist).

AERO 3240 Orbital Mechanics

Fall 2009, Fall 2010, Fall 2011

This was a brand new course at Carleton University in 2009, introduced for the new space stream in the undergraduate Aerospace program. I developed the entire curriculum for this course. I earned

the highest student teaching evaluation in the Department of Mechanical and Aerospace Engineering, every semester that I taught this course.

This is a third-year undergraduate course, covering the fundamentals of orbital mechanics. Topics include: vectors, reference frames, kinematics and dynamics, the two-body problem, preliminary orbit determination, orbital maneuvers, interplanetary missions, orbital perturbations and spacecraft formation flying.

MAAE 4500 Feedback Control Systems

Fall 2009

This is a fourth-year undergraduate course, covering the fundamentals of classical control. Topics include: transfer functions, block diagrams, first and second order systems, step response, Routh stability criterion, root locus, frequency response, Nyquist stability criterion, control system design.

MAAE 2001 Engineering Graphical Design

Winter 2009, Winter 2010, Winter 2011, Winter 2012

This is a second-year undergraduate course, covering the fundamentals of engineering drawing, and an introduction to the engineering design process. Topics covered include: elementary descriptive geometry, true length, true view, and intersection of geometric entities, developments, engineering drawing techniques, fits and tolerances, working drawings, fasteners, and the design process.

GRADUATE
SUPERVISION (AT
RYERSON
UNIVERSITY)

Name	Degree	Thesis/Project Title (co-supervisor)	Years
Anmin Zou	Post-Doc	Control of Space Systems (Krishna Kumar)	2013 - 2014
Anantha Komanduri	Post-Doc	Autonomous Rendezvous and Docking in Halo Orbits about Earth-Moon Lagrange Points	2012 - 2014
Min Adhikari	Ph.D.	Real-Time Obstacle Avoidance for a UAV using Optimal Control	2015 - Present
Alexander Frias	Ph.D.	Output Feedback Control of Underactuated Space Systems (Krishna Kumar)	2012 - Present
Devin Simms	M.Eng	UAV Flying in Gusty Urban Environments (Jason Etele)	2015 - Present
Bryce Wildish	M.A.Sc	Optimal Ground Station Scheduling	2014 - Present
Dante Bolatti	M.A.Sc	Coupled Orbital/Attitude Dynamics Around Asteroids	2014 - Present
Maksims Demjanenko	M.Eng	Constrained Kalman Filtering	2013 - Present
Long Tran	M.A.Sc	Spacecraft Attitude Determination using Unconventional Measurements	2013 - Present
Min Adhikari	M.A.Sc	Real-Time Obstacle Avoidance for a UAV using Optimal Control	2013 - 2014

GRADUATE
SUPERVISION (AT
CARLETON
UNIVERSITY)

Name	Degree	Thesis Title (co-supervisor)	Years
Adam Vigneron	M.A.Sc	Nonlinear Filtering for Autonomous Navigation of Spacecraft in Highly Elliptical Orbit (Bruce Burlton)	2011 - 2014
Shahaboddin Owlia	M.A.Sc	Real-Time Autonomous Obstacle Avoidance for Low-Altitude Fixed-Wing Aircraft	2010 - 2013
Robert Hewitt	M.A.Sc	Applying FastSLAM to Articulated Rovers (Alex Ellery)	2009 - 2012
Everett Findlay	M.A.Sc	Investigation of Active Vibration Suppression of a Flexible Satellite Using Magnetic Attitude Control (Hugh Liu and Christopher Damaren, University of Toronto)	2009 - 2011

PUBLICATIONS

BOOKS

1. A.H.J. de Ruiter, C.J. Damaren and J.R. Forbes, "Spacecraft Dynamics and Control - An Introduction," *John Wiley and Sons*, West Sussex, United Kingdom, 2013.
2. A.H.J. de Ruiter, C.J. Damaren, J.R. Forbes, "Spacecraft Dynamics and Control - An Introduction, EXERCISES," *John Wiley and Sons*, September 2013. *Separate publication from the book, and available from the publishers website,* <http://www.wiley.com//legacy/wileychi/deRuiter/index.html>
3. A.H.J. de Ruiter, C.J. Damaren, J.R. Forbes, "Spacecraft Dynamics and Control - An Introduction, Solutions Manual," *John Wiley and Sons*, September 2013. *Separate publication from the book, and available from the publishers website,* <http://www.wiley.com//legacy/wileychi/deRuiter/index.html>

ARTICLES IN REFEREED PUBLICATIONS

1. A.H.J. de Ruiter, L. Tran, B.S. Kumar, A. Muntyanov, "Sun Vector Based Attitude Determination of Passively Magnetically Stabilized Spacecraft," *AIAA Journal of Guidance, Control and Dynamics*, accepted for publication on 19 February 2016.
2. A. Zou, A.H.J. de Ruiter, K.D. Kumar, "Distributed attitude synchronization control for a group of flexible spacecraft using only attitude measurements," *Information Sciences*, Vol. 343-344, 2016, pp. 66-78.
3. A.H.J. de Ruiter, "Observer-Based Adaptive Spacecraft Attitude Control with Guaranteed Performance Bounds," *IEEE Transactions on Automatic Control*, in press.
4. A. Zou, A.H.J. de Ruiter, K.D. Kumar, "Distributed Finite-Time Output Feedback Attitude Coordination Control for Spacecraft Formations," *Automatica*, 67, 2016, pp. 46-53.
5. A.H.J. de Ruiter, "Quadratically Constrained Least Squares with Aerospace Applications," *AIAA Journal of Guidance, Control and Dynamics*, in press, doi: 10.2514/1.G001647.
6. E.L. de Angelis, F. Giuliotti, A.H.J. de Ruiter, G. Avanzini, "Spacecraft Attitude Control Using Magnetic and Mechanical Actuation," *AIAA Journal of Guidance, Control and Dynamics*, in press, doi: 10.2514/1.G000957.
7. S. Owlia and A.H.J. de Ruiter, "Autonomous Obstacle Avoidance for Fixed-Wing Unmanned Aerial Vehicles," *The Aeronautical Journal*, Vol. 119, No. 1221, November 2015, pp 1415-1436.
8. A.H.J. de Ruiter, J.R. Forbes, "Generalized Euler Sequences Revisited", *Journal of the Astronautical Sciences*, Vol. 62, No. 1, 2015, pp. 1-20.

9. A. Zou, K.D. Kumar, A.H.J. de Ruiter, "Robust Attitude Tracking Control of Spacecraft Under Control Input Magnitude and Rate Saturations," *International Journal of Robust and Nonlinear Control*, 26 (4), 2016, pp. 799-815.
10. A.H.J. de Ruiter, "Computationally Simple Sub-Optimal Filtering for Spacecraft Motion Estimation", *Automatica*, 57, 2015, pp. 105-112.
11. J.R. Forbes and A.H.J. de Ruiter, "Linear-Matrix-Inequality-Based Solution to Wahba's Problem," *AIAA Journal of Guidance, Control and Dynamics*, 38 (1), 2015, pp. 147-151.
12. J.R. Forbes, A.H.J. de Ruiter, D.E. Zlotnik, "Continuous-Time Norm-Constrained Kalman Filtering," *Automatica*, 50 (10), 2014, pp. 2546-2554.
13. A.H.J. de Ruiter and J.R. Forbes, "General Identities for Parameterizations of SO(3) with Applications," *ASME Journal of Applied Mechanics*, 81 (7), 2014, doi: 10.1115/1.4027144.
14. A.H.J. de Ruiter and J.R. Forbes, "On the Solution of Wahba's Problem on SO(n)," *The Journal of the Astronautical Sciences*, 60 (1), 2013, pp. 1-31.
15. A.H.J. de Ruiter, "Some Applications of Passivity-Based Control and Invariance Principles," *IET Control Theory and Applications*, 7 (7), 2013, pp. 1039-1048.
16. E.J. Findlay, A.H.J. de Ruiter, J.R. Forbes, H.H.T. Liu, C.J. Damaren, J. Lee, "Magnetic Attitude Control of a Flexible Satellite," *AIAA Journal of Guidance, Control and Dynamics*, 36 (5), 2013, pp. 1522-1526.
17. A.H.J. de Ruiter, "Spacecraft Attitude Tracking with Guaranteed Performance Bounds," *AIAA Journal of Guidance, Control and Dynamics*, 36 (4), 2013, pp. 1214-1221.
18. A.H.J. de Ruiter, "Improving Transient Performance in Computationally Simple Gyro-Corrected Satellite Attitude Determination," *Proc. IMechE, Part G: J. Aerospace Engineering*, 2012, 226 (11), pp. 1432-1444.
19. A.H.J. de Ruiter, "Magnetic Control of Dual-Spin and Bias Momentum Spacecraft," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 35, No. 4, 2012, pp. 1158-1168.
20. A.H.J. de Ruiter, "A Fault-Tolerant Magnetic Spin Stabilizing Controller for the JC2Sat-FF Mission," *Acta Astronautica*, Vol. 68, No. 1-2, 2011, pp. 160-171.
21. B.S. Kumar, A. Ng, K. Yoshihara, A.H.J. de Ruiter, "Differential Drag as a Means of Spacecraft Formation Control," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 47, No. 2, 2011, pp. 1125-1135.
22. A.H.J. de Ruiter, "Adaptive Spacecraft Attitude Tracking Control with Actuator Saturation," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 33, No. 5, 2010, pp. 1692-1696.
23. A.H.J. de Ruiter, "Adaptive Spacecraft Formation Flying with Actuator Saturation," *Proc. IMechE, Part I: J. Systems and Control Engineering*, 2010, 224 (4), pp. 373-385.
24. A.H.J. de Ruiter, "A Simple Suboptimal Kalman Filter Implementation for a Gyro-Corrected Satellite Attitude Determination System," *Proc. IMechE, Part G: J. Aerospace Engineering*, 2010, 224 (7), pp. 787-802.
25. A.H.J. de Ruiter and H.H.T. Liu, "A Parameter Optimization Approach to Multiple-Objective Controller Design," *IEEE Transactions on Control Systems Technology*, No. 2, Vol. 12, 2008, pp. 330-339.
26. Y. Kim, A.H.J. de Ruiter, J. Lee and A. Ng, "Robust Implementation of Kalman Filter for INS Correction," *Actual Problems of Aviation and Aerospace Systems: Processes, Models, Experiment*, No. 3(25), Vol. 12, Kazan-Daytona Beach, 2007, pp. 55-74.
27. A.H.J. de Ruiter and C. Damaren, "Extended Kalman Filtering and Nonlinear Predictive Filtering for Spacecraft Attitude Determination," *Canadian Aeronautics and Space Journal*, Vol. 48, 2002, pp. 13-24.

JOURNAL
ARTICLES
SUBMITTED
FOR
PUBLICATION

1. A.C. Vigneron, A.H.J. de Ruiter, B.V. Burlton, W.K.H. Soh, "Nonlinear Filtering for Autonomous Navigation of Spacecraft in Highly Elliptical Orbit," *Acta Astronautica*, revision requested 21 November 2015.
2. A.H.J. de Ruiter, J.R. Forbes, M. Demjanenko, "On Constrained Kalman Filtering," *IEEE Transactions on Automatic Control*, submitted 16 September 2015.
3. A.H.J. de Ruiter and J.R. Forbes, "Continuous-Time $O(n)$ -Constrained Kalman Filtering," *International Journal of Robust and Nonlinear Control*, submitted 28 August 2015.
4. A.H.J. de Ruiter and J.R. Forbes, "Discrete-Time $SO(n)$ -Constrained Kalman Filtering," *AIAA Journal of Guidance, Control and Dynamics*, submitted 23 August 2015.
5. A. Zou, A.H.J. de Ruiter, K.D. Kumar, "Finite-Time Output Feedback Attitude Control for Rigid Spacecraft Under Control Input Saturation," *Journal of the Franklin Institute*, revision requested 18 March 2015.

REFEREED
CONFERENCE
PAPERS

1. A.H.J. de Ruiter, "Observer-Based Spacecraft Attitude Tracking with Guaranteed Performance Bounds," Proceedings of the 2015 American Control Conference, Chicago, Illinois, 1-3 July 2015.
2. A.H.J. de Ruiter, "SO(3)-Constrained Kalman Filtering with Application to Attitude Estimation", Proceedings of the 2014 American Control Conference, Portland, Oregon, 4-6 June, 2014.
3. E.J. Findlay, J.R. Forbes, H.H.T. Liu, A. de Ruiter, C.J. Damaren, J. Lee, "Investigation of Active Vibration Suppression of a Flexible Satellite using Magnetic Attitude Control," Proceedings of the 2011 AIAA Guidance, Navigation and Control Conference, Portland, Oregon, 8-11 August, 2011.
4. A. de Ruiter, J. Lee, A. Ng, C. Lambert, J-F. Hamel, J. de Lafontaine and B. Shankar, "Overview of Japan Canada Joint Collaboration Satellites (JC2Sat) GNC Challenges and Design," Proceedings of the 2010 AIAA Guidance, Navigation and Control Conference, Toronto, Canada, 2-5 August, 2010.
5. A. de Ruiter, J. Lee and A. Ng, "A Fault Tolerant Magnetic Spin Stabilizing Controller for the JC2Sat-FF Mission," Proceedings of 2008 Guidance, Navigation and Control Conference, Honolulu, Hawaii, 18-21 August 2008.
6. B.S. Kumar, A. Ng, K. Yoshihara, A. de Ruiter, "Differential Drag as a Means of Spacecraft Formation Control," 2007 IEEE Aerospace Conference, Big Sky, Montana, 3-10 March, 2007.
7. A.H.J. de Ruiter, and H.H.T. Liu, "Decoupled Controller Design for One-Way Coupled Systems - A State-Space Approach," 2004 AIAA Guidance, Navigation, and Control Conference, Providence, Rhode-Island, August 16-19, 2004.
8. A.H.J. de Ruiter and H.H.T. Liu, "A Systematic Controller Design Procedure for One-Way Coupled Systems," 2004 AIAA Guidance, Navigation, and Control Conference, Providence, Rhode-Island, August 16-19, 2004.
9. A.H.J. de Ruiter and H.H.T. Liu, "Control Design Decoupling for Two-Way Coupled Systems," 2004 IEEE Conference on Control Applications, Taipei, Taiwan, September 2-4, 2004.
10. A.H.J. de Ruiter and H.H.T. Liu, "Integrated Multiple Objective Controller Design for One-Way Coupled Systems," Proc. 2003 American Control Conference, Denver, Colorado, June 4-6, 2003.
11. H.T. Liu, D. Harman and A. de Ruiter, "Real-Time Flight Control in an Emergency Landing: Sampling Rate Considerations," Proc. 2003 AIAA Guidance, Navigation, and Control Conference, Austin, Texas, August 11-14, 2003.

12. A.H.J. de Ruiter and C.J. Damaren, "Effect of Attitude Parameterization on the Performance of Passivity-Based Adaptive Attitude Control," Proc. 2001 AIAA Guidance, Navigation, and Control Conference, Montreal, Canada, August 6-9, 2001.
1. S. Lee, H.M. Yang, A. de Ruiter, "Performance Analysis and Improvement on the Existing Ground Station for JC2SAT Mission," *Proceedings of The Institute of Electronics Engineers of Korea*, 6, 2014, pp. 458-461.
2. W. Soh, J. Michels, D. Asquin, A. Vigneron, A. de Ruiter, R. Buckingham, "Onboard Navigation for the Canadian Polar Communications and Weather Satellite in Tundra Orbit," Proceedings of the International Astronautical Congress, Toronto, Canada, September 29-October 3, 2014.
3. A. Frias, K. Kumar, A. de Ruiter, "Robust Nonlinear Control of Underactuated Spacecraft Using a Single Thruster," Proceedings of the International Astronautical Congress, Toronto, Canada, September 29-October 3, 2014.
4. R. Hewitt, A. Ellery, A. de Ruiter, "Efficient Navigation and Mapping Techniques for the Kapvik Analogue Micro-Rover" Proceedings of the Global Space Exploration Conference, Washington, D.C., U.S.A., 2012.
5. R. Hewitt, A. Ellery, A. de Ruiter, "FastSLAM on a Planetary Micro-rover Prototype," Proc. CASI ASTRO 2012 Conference, Quebec City, April 24-26, 2012
6. J.-F. Hamel, A. St-Amour, J. de Lafontaine, J. Lee, C. Lambert, A. Ng, A. de Ruiter "Overview of JC2Sat-FF Guidance, Navigation and Control Architecture," 4th International Symposium on Formation Flying, Missions and Technologies, CSA St-Hubert, Quebec, Canada, 18-20 May, 2011.
7. E.J. Findlay, H.H.T. Liu, A. de Ruiter, C.J. Damaren, J.R. Forbes, J. Lee, "Investigation of Satellite Flexibility due to Increased Drag Panel Area for Differential Drag Formation Flying," 4th International Symposium on Formation Flying, Missions and Technologies, CSA St-Hubert, Quebec, Canada, 18-20 May, 2011.
8. J. Lee, A. de Ruiter, A. Ng, C. Lambert, Y. Kim, K. Yoshihara, "Attitude Determination and Control Subsystem of JC2SAT-FF Mission," 12th International Space Conference of Pacific-basin Societies, Montreal, Quebec, Canada, 27-30 July, 2010.
9. A. de Ruiter, M. van Mierlo, J. Lee, S. Martins, A. Ng, K. Yoshihara, "A "Power Positive Parking" Attitude Mode with a Fault-Tolerant Magnetic Spin Stabilizing Controller for the JC2Sat Mission," Proceedings of 27th International Symposium on Space Technology and Science, Japan, July 5-12, 2009.
10. A. de Ruiter, J. Lee, and A. Ng, "A Fault Tolerant Magnetic Bias Momentum Control Law," Proceedings of 3rd CSA-IAA Conference on Advanced Space Systems and Applications, Shanghai, China, 29 Oct - 1 Nov 2008.
11. K. Yoshihara, M. van Mierlo, A. Ng, B. Shankar Kumar, A. de Ruiter, Y. Komatsu, H. Horiguchi, and H. Hashimoto, "JC2Sat-FF: An International Collaboration Nano-Sat Project - Overview of the System Analyses and Design," The 4S Symposium, Rhodes, Greece, 26-30 May 2008.
12. A. de Ruiter, A. Ng and J. Lee, "Orbit Propagation and Relative Positioning Techniques for JC2Sat," 3rd International Symposium on Formation Flying, Missions and Technologies, ESA/ESTEC Noordwijk, The Netherlands, 23-25 April, 2008.
13. K. Yoshihara, T. Yamamoto, Y. Kondoh, H. Hashimoto, A. Ng, A. de Ruiter, J. Lee, "Performance Assessment of Single and Dual Frequency, Commercial-Based GPS Receivers for LEO Orbit," 21st Annual Conference on Small Satellites, Utah State University, Logan, Utah, 13-16 August 2007.

14. A. Ng, K. Yoshihara, H. Hashimoto, L. Ngo-Phong, B.S. Kumar, A. de Ruiter, "Nanosatellite Mission for Demonstrating Formation Keeping Technology with Aerodynamic Drag," 11th International Space Conference of Pacific-basin Societies, Beijing, China, 16–18 May, 2007.
15. H.H.T. Liu and A. de Ruiter, "Control Integration Process in Aircraft Systems Development," Proceedings of the 23rd International Congress of Aeronautical Sciences (ICAS), Toronto, Canada, September 8–13, 2002, ICAS 2002-R37.
16. A. de Ruiter and C. Damaren, "Extended Kalman Filtering and Nonlinear Predictive Filtering for Spacecraft Attitude Determination," Proc. CASI ASTRO 2000 Conference, Ottawa, November 7–9, 2000.

TECHNICAL REPORTS

1. A. de Ruiter, Y. Kim, J. Lee, C. Lambert and A. Ng, "JC2Sat Attitude Determination and Control Subsystem Design, Analysis and Simulation - Critical Design Review Document," Parts 1 and 2, Technical Report to the JC2Sat Mission, JCF-00011, Canadian Space Agency/Japan Aerospace Exploration Agency, July 2009.
2. A. de Ruiter, J. Lee, K. Yoshihara, A. Ng, "GPS-Based Orbital Determination and Relative Navigation for JC2Sat," Technical Report to the JC2Sat Mission, JCF-000112, Canadian Space Agency/Japan Aerospace Exploration Agency, June 2009.
3. A. de Ruiter, "Feasibility Study for JC2Sat-FF Attitude Control using Two Magnetic Torque Rods and One Momentum Wheel," Rev.00, Technical Report to Space Technology Research Program STRP-007 (2007/2008), Space Technologies, Canadian Space Agency.
4. A. de Ruiter, "Integrated GPS/INS Spacecraft Position and Attitude Determination - Problem Formulation and Filter Implementation Issues," Rev.00, Technical Report to Space Technology Research Program STRP-010 (2006/2007), Space Technologies, Canadian Space Agency.
5. A. de Ruiter, "Preliminary Study on Indoor GPS-Like Positioning Methods," Rev.01, Technical Report to Space Technology Research Program STRP-010 (2006/2007), Space Technologies, Canadian Space Agency.

INVITED PRESENTATIONS

1. A. de Ruiter, "Guidance, Navigation and Control of Aerospace Systems," York University, August 2014.
2. A. de Ruiter, "Sequential Lyapunov Analysis with Applications to Spacecraft Attitude Control," Presented as part of the University of Michigan Control Seminar Series, April 2014.
3. A. de Ruiter, "Overview of Japan Canada Joint Collaboration Satellites (JC2Sat) GNC Challenges and Design," Presented to Concordia University Department of Mechanical and Industrial Engineering, February 2011.
4. A. Ng, A. de Ruiter and J. Lee, "Japan Canada Joint Collaboration Satellite - Formation Flying (JC2Sat-FF)," Presented to the University of Western Ontario Laboratory of Control Instrumentation and Electrical Systems, May 2008.
5. A. Ng, A. de Ruiter and J. Lee, "Japan Canada Joint Collaboration Satellite - Formation Flying (JC2Sat-FF)," Presented to the University of Calgary Geomatics Department, May 2007.

SERVICE TO THE DEPARTMENT AND UNIVERSITY

- In 2011-2012, I was part of the Dynamics and Control Undergraduate Curriculum Review committee at Carleton University. We were responsible for going through the course outlines for all undergraduate courses related to dynamics and controls, and identify overlaps and deficiencies.
- In 2012-2013, I was part of the committee responsible for re-organizing the undergraduate space option curriculum in the Aerospace Engineering Department at Ryerson University. In particular, this led to the introduction of the new course AER 627 Space Robotics.

- I made a presentation to prospective students for Aerospace Engineering at Discover Ryerson in Winter 2013.
- From 2013 to present, I am chair of the Aerospace Curriculum Committee at Ryerson University.
- In 2013-2014, I was chair of the Aerospace Departmental Council at Ryerson University.
- In 2013-2014, I was chair of the Aerospace Curriculum Review Dynamics Group at Ryerson University. We were responsible for going through the course outlines for all undergraduate courses related to dynamics and controls, and identify overlaps and deficiencies.
- In Fall 2013, I served as a judge at the Faculty of Engineering and Architectural Science Graduate Research Symposium.
- In Fall 2013 and Fall 2014, I gave a short talk to incoming undergraduate aerospace engineering students.
- In Winter 2014, I served as a judge at the Ryerson Engineering and Architecture Day.
- I represented the department of Aerospace Engineering at Discover Ryerson in Fall 2014.
- From 2014 to present, I am serving on the membership committee of the Graduate Program Council in the Department of Aerospace Engineering at Ryerson University.
- I represented the Ryerson University Department of Aerospace Engineering at the 2014 and 2015 Ontario Universities Fairs.
- From June 2015 to present, I am chair of the Ryerson University Department of Aerospace Engineering Departmental Evaluation Committee.

THESIS EXAMINING BOARDS

- 1 Ph.D. at York University (External Examiner)
- 4 M.A.Sc at Ryerson University
- 5 Ph.D. at Ryerson University
- 2 Ph.D. candidacy exams at Ryerson University
- 4 Ph.D. at Carleton University
- 4 M.A.Sc at Carleton University
- 2 M.A.Sc at University of Ottawa
- 3 Ph.D. thesis proposal exams at Carleton University

EXTRA-UNIVERSITY AND PROFESSIONAL ACTIVITIES

EDITORIAL ACTIVITIES

Co-Guest Editor for special issue on “Sensor Innovations for Spacecraft Guidance, Navigation, and Control” in *Sensors Journal*

Member of the International Astronautical Federation Astrodynamics Committee, October 2014 – Present.

Editorial Board Member, *IMechE Journal of Aerospace Engineering*, December 2014 – Present.

Associate Editor, *IMechE Journal of Aerospace Engineering*, September 2015 – Present.

REVIEWER FOR FUNDING AGENCIES

MITACS

NSERC

PEER-REVIEWER FOR RESEARCH JOURNALS AND CONFERENCES

IEEE Transactions on Automatic Control

Automatica

International Journal of Robust and Nonlinear Control

AIAA Journal of Guidance, Control and Dynamics

AIAA Journal of Spacecraft and Rockets

IEEE Transactions on Aerospace and Electronic Systems

IEEE Sensors Journal

IEEE Transactions on Automation Science and Engineering

Robotics and Computer Integrated Manufacturing

Proceedings of the I.Mech.E. Part G. Journal of Aerospace Engineering

Proceedings of the I.Mech.E. Part I. Journal of Systems and Control Engineering

Chinese Journal of Aeronautics

Canadian Aeronautics and Space Journal

Acta Astronautica

International Journal of Control

Systems and Control Letters

Journal of the Astronautical Sciences

The Aeronautical Journal

Aerospace Science and Technology

Advances in Mechanical Engineering

Advances in Space Research

Geomatica

ASME Journal of Applied Mechanics

International Journal of Aerospace Engineering

Mathematical Problems in Engineering

IEEE Conference on Decision and Control

IEEE American Control Conference

Indian Control Conference

AIAA Guidance, Navigation and Control Conference

MEMBERSHIPS IN PROFESSIONAL SOCIETIES

American Institute for Aeronautics and Astronautics (AIAA) - Senior Member

Institute of Electrical and Electronic Engineers (IEEE) - Member

Canadian Aeronautics and Space Institute (CASI) - Member

Institute of Navigation (ION) - Member

Professional Engineers of Ontario (PEO) - Member