

Dr. habil. László Kollár

Associate Professor

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ACADEMIC DEGREES

- 06/2002** **M.Sc. in Mathematics**
Title of thesis: *Numerical Stability Analysis of a Respiratory Control System Model*
The University of Texas at Dallas, Richardson, Texas, USA
- 02/2002** **Ph.D. in Mechanical Engineering**
Title of dissertation: *Dynamics of Digitally Controlled Unstable Mechanical Systems*
Budapest University of Technology and Economics, Budapest, Hungary
- 06/1997** **M.Sc. in Mechanical Engineering**
Title of thesis: *Az egyensúlyozás dinamikája (Dynamics of Balancing; in Hungarian)*
Budapest University of Technology and Economics, Faculty of Mechanical Engineering
Budapest, Hungary

WORKPLACES

- 2017 -** **Associate Professor**
Eötvös Loránd University, Faculty of Informatics, Savaria Institute of Technology
- 2014-2017** **Associate Professor**
University of West Hungary, Faculty of Natural Sciences and Technology:
Savaria Institute of Technology, Department of Mechanical Engineering
- 2012 – 2014** **Research Fellow**
University of Huddersfield, School of Computing and Engineering
- 2002 – 2012** **Research Professor on grant / Postdoctoral Fellow (until 2005)**
University of Quebec at Chicoutimi, Industrial Chair on Atmospheric Icing of Power Network
Equipment (CIGELE) and Canada Research Chair on Atmospheric Icing Engineering of Power
Network (INGIVRE)
- 2001 – 2002** **Teaching Assistant**
University of Texas at Dallas, School of Natural Sciences and Mathematics:
Department of Mathematical Sciences
- 1997 – 2001** **Ph.D. student**
Budapest University of Technology and Economics, Faculty of Mechanical Engineering:
Department of Applied Mechanics

RESEARCH INTERESTS

- **Dynamical Systems, Vibrations:** Numerical modelling and small-scale experiments of cable vibration (due to sudden or propagating load shedding; induced by wind; due to shock load). Numerical stability analysis of retarded differential equations; application for a model of the human respiratory control system. Dynamics of controlled piecewise linear and nonlinear systems considering sampling and processing delays; application for a model of human balancing.

- **Fluid Mechanics, Thermal Sciences:** Reconstruction of velocity profiles using electromagnetic flow measurement. Inverse design of aerofoils (wind turbine blades, aircraft wings) considering extreme weather conditions. Modelling two-phase flows considering collision, evaporation and turbulent dispersion of particles. Simulation of icing processes numerically and in wind tunnel.

TEACHING ACTIVITY

Lecturer

- Course (BSc): Aerodynamics, Fluid Dynamics
- Course (MSc/PhD): Complements in Heat Transfer, Continuum Mechanics, Vehicle Aerodynamics and Air Management
- Special subjects (MSc/PhD): Ice – Material Interface, Advanced Modeling

Teaching Assistant

- Course (BSc): Aerodynamics, Differential Equations
- Course (BSc), teacher assistant: Algebra, Calculus, Kinematics and Dynamics, Strength of Materials, Vibrations

Supervisor / reviewer

- Co-director, 2 PhD and 2 MSc students
- Thesis reviewer, 4 PhD and 2 MSc theses
- Doctoral exams: Dynamics, Fluid Mechanics, Heat Transfer, Strength of Materials, Thermodynamics of Atmospheric Ice

LANGUAGES

- English: writing, reading, speaking (fluent)
- French: writing, reading, speaking (fluent)
- Russian: writing, reading, speaking (basic)
- Hungarian: writing, reading, speaking (native)

SOFTWARES

- Programming language: Fortran
- Mathematics and simulations: Matlab, Mathematica, Maple
- Finite element software: Adina
- CAD software: AutoCad (alapok)

ACTIVITIES IN SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Journals – review work

- AIAA Journal of Thermophysics and Heat Transfer
- Cold Regions Science and Technology
- Engineering Failure Analysis
- European Transactions on Electrical Power
- IEEE Transactions on Power Delivery
- International Journal of Heat and Fluid Flow
- Journal of Flow Measurement and Instrumentation
- Journal of Mechanical Science and Technology
- Journal of Wind Engineering and Industrial Aerodynamics
- Mathematics and Computers in Simulation
- Mathematical Problems in Engineering
- The Open Electrical & Electronic Engineering Journal

Conferences – co-chairman and review work

- Review work, 8th International Symposium on Cable Dynamics, Paris, France, 2009
- Review work, ASME Design Engineering Technical Conferences, Las Vegas, NV, USA, 2007

- Member of Reviewing Committee, 11th International Workshop on Atmospheric Icing of Structures, Montreal, QC, Canada, 2005 (reviewer of 3 papers)
- Section co-chairman, 11th World Congress in Mechanism and Machine Science, Tianjin, China, 2004 (Section: Nonlinear Oscillations 2)
- Review work, ASME Design Engineering Technical Conferences, Pittsburgh, PA, USA, 2001 (2 papers)

Professional Association

- Junior member, Order of Quebec Engineers, 2009-2012

Scientific activities for students

- Organization of scientific competitions for students (annually or biannually between 2008 and 2012) University of Quebec at Chicoutimi
- Judge for Scientific Conference of Students Canada-Wide Science Fair, Saguenay, QC, Canada, 2006

GRANTS, AWARDS, PRIZES

Research grants (principal investigator)

- 2007 – 2009** Subject: Ice and snow shedding from conductors
Source: *Institutional Research Support Program*, University of Quebec at Chicoutimi
- 2006 – 2007** Subject: Ice shedding from bundled conductors
Source: *Institutional Research Support Program*, University of Quebec at Chicoutimi

Awards (undergraduate/graduate)

- 2002** **Rubik** Foundation (scholarship for foreign study)
- 1999 – 2000** **Gruber-Fúzy** study scholarship (2 semesters)
- 1997** 2nd prize
Scientific Conference of Students
Faculty of Mechanical Engineering, Budapest University of Technology and Economics
Title: *Computation and Measurement of One Dimensional Gas Oscillations (in Hungarian)*
- 1997** **Scientific Society of Mechanical Engineering** award for M.Sc. thesis
- 1997** **Faculty of Mechanical Engineering** study scholarship
Budapest University of Technology and Economics
- 1997** 2nd prize
National Scientific Conference of Students, Engineering Sciences section
Title: *Dynamics of Balancing (in Hungarian)*
- 1996 – 1997** **Hungarian Republic** distinguished scholarship (2 semesters)
- 1996** 1st prize
Scientific Conference of Students
Faculty of Mechanical Engineering, Budapest University of Technology and Economics
Title: *Dynamics of Balancing (in Hungarian)*

PUBLICATIONS

Book, book chapter:

1. Kollar, L. E., Farzaneh, M., Modeling and Experimental Study of Variation of Droplet Cloud Characteristics in a Low-Speed Horizontal Icing Wind Tunnel, Chapter 3 in: *Wind Tunnels: Aerodynamics, Models and Experiments*, Nova Science Publishers, inc., Hauppauge, NY, pp. 93-127, 2011.
Available (open access item): https://www.novapublishers.com/catalog/product_info.php?products_id=25802

Reviewed journal papers with impact factor:

1. Kollar, L. E., Lucas, G. P., Zhang, Z., Proposed Method for Reconstructing Velocity Profiles Using a Multi-Electrode Electromagnetic Flow Meter, *Measurement Science and Technology*, Vol. 25, No. 7, 14pp, 2014. IF (2013): 1.352
2. Hefny, R. M. H., Kollar, L. E., Farzaneh, M., Modelling the Influence of Periodic Loads on Snow Detachment from Suspended Cables, *Cold Regions Science and Technology*, Vol. 101, pp. 31-39, 2014. IF (2013): 1.444
3. Asim, T., Mishra, R., Kollar, L. E., Pradhan, S. R., Optimal Sizing and Life-Cycle Cost Modelling of Pipelines Transporting Multi-Sized Solid-Liquid Mixtures, *International Journal of Pressure Vessels and Piping*, Vol. 113, pp. 40-48, 2014. IF (2013): 1.078
4. Banitalebi Dehkordi, H., Farzaneh, M., Van Dyke, P., Kollar, L. E., The effect of droplet size and liquid water content on ice accretion and aerodynamic coefficients of tower legs, *Atmospheric Research*, Vol. 132-133, pp. 362-374, 2013. IF (2013): 2.421
5. Kollar, L. E., Farzaneh, M., Modeling Sudden Ice Shedding from Conductor Bundles, *IEEE Transactions on Power Delivery*, Vol. 28, No. 2, pp. 604-611, 2013. IF (2013): 1.657
6. Kermani, M., Farzaneh, M., Kollar, L. E., The Effects of Wind Induced Conductor Motion on Accreted Atmospheric Ice, *IEEE Transactions on Power Delivery*, Vol. 28, No. 2, pp. 540-548, 2013. IF (2013): 1.657
7. Kollar, L. E., Farzaneh, M., Van Dyke, P., Modeling Ice Shedding Propagation on Transmission Lines with or without Interphase Spacers, *IEEE Transactions on Power Delivery*, Vol. 28, No. 1, pp. 261-267, 2013. IF (2013): 1.657
8. Kermani, M., Farzaneh, M., Kollar, L. E., Estimation of stresses in atmospheric ice during aeolian vibration of power transmission lines, *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 98, No. 10-11, pp. 592-599, 2010. IF (2010): 1.213
9. Kollar, L. E., Farzaneh, M., Wind-Tunnel Investigation of Icing of an Inclined Cylinder, *Int. J. of Heat and Mass Transfer*, Vol. 53, No. 5-6, pp. 849-861, 2010. IF (2010): 1.899
10. Kollar, L. E., Olqma, O., Farzaneh, M., Natural Wet-Snow Shedding from Overhead Cables, *Cold Regions Science and Technology*, Vol. 60, No. 1, pp. 40-50, 2010. IF (2010): 1.488
11. Kollar, L. E., Farzaneh, M., Modeling the Dynamic Effects of Ice Shedding on Spacer Dampers, *Cold Regions Science and Technology*, Vol. 57, No. 2-3, pp. 91-98, 2009. IF (2009): 1.416
12. Kollar, L. E., Farzaneh, M., Spray Characteristics of Artificial Aerosol Clouds in a Low-Speed Icing Wind Tunnel, *Atomization and Sprays*, Vol. 19, No. 4, pp. 389-407, 2009. IF (2009): 0.754
13. Kollar, L. E., Farzaneh, M., Vibration of Bundled Conductors Following Ice Shedding, *IEEE Transactions on Power Delivery*, Vol. 23, No. 2, pp. 1097-1104, 2008. IF (2008): 1.289
14. Kollar, L. E., Farzaneh, M., Modeling the Evolution of Droplet Size Distribution in Two-Phase Flows, *Int. J. of Multiphase Flow*, Vol. 33, No. 11, pp. 1255-1270, 2007. IF (2007): 1.137
15. Karev, A. R., Farzaneh, M., Kollar, L. E., Measuring Temperature of the Ice Surface during Formation by Using Infrared Instrumentation, *Int. J. of Heat and Mass Transfer*, Vol. 50, No. 3-4, pp. 566-579, 2007. IF (2007): 1.500
16. Kollar, L. E., Farzaneh, M., Karev A. R., Modeling Droplet Size Distribution near a Nozzle Outlet in an Icing Wind Tunnel, *Atomization and Sprays*, Vol. 16, No. 6, pp. 673-686, 2006. IF (2006): 0.415

17. Kollar, L. E., Farzaneh, M., Karev A. R., Modeling Droplet Collision and Coalescence in an Icing Wind Tunnel and the Influence of these Processes on Droplet Size Distribution, *Int. J. of Multiphase Flow*, Vol. 31, No. 1, pp. 69-92, 2005. IF (2005): 1.306
18. Kollar, L. E., Stepan, G., Turi, J., Dynamics of Piecewise Linear Discontinuous Maps, *Int. J. of Bifurcation and Chaos*, Vol. 14, No. 7, pp. 2341-2351, 2004. IF (2004): 1.019
19. Stepan, G., Kollar, L. E., Balancing with Reflex Delay, *Mathematical and Computer Modelling*, Vol. 31, pp. 199-205, 2000. IF (2000): 0.387

Reviewed journal papers:

1. Alghadhi, M., Ball, A., Kollar, L. E., Mishra, R., Asim, T., Fuel Consumption Tabulation in Laboratory Conditions, *International Journal of Recent Development in Engineering and Technology*, Vol. 2, No. 4, pp. 29-38, 2014.
2. Kollar, L. E., Mishra, R., Asim, T., Particle size effects on optimal sizing and lifetime of pipelines transporting multi-sized solid-liquid mixtures, *Procedia CIRP* 11, pp. 317-322, 2013. (presented at the *Proc. of 2nd International Through-life Engineering Services Conference*, Cranfield, UK)
3. Asim, T., Mishra, R., Kollar, L. E., Ubbi, K., Optimisation of a Horizontal Capsule Transporting Pipeline carrying Cylindrical Capsules, *Journal of Physics: Conference Series* 364, 2012. (presented at the *25th International Congress on Condition Monitoring and Diagnostic Engineering*, Huddersfield, UK)
4. Hefny, R. M. H., Kollar, L. E., Farzaneh, M., Simulation of Snow Adhesion on Real Scale Lines, *International Journal of Mechanical Engineering and Mechatronics*, Vol. 1, No. 1, pp. 102-108, 2012.
5. Hefny, R. M. H., Kollar, L. E., Farzaneh, M., Experimental Investigation of Dynamic Force on the Performance of Wet Snow Shedding, *International Journal of Mechanical Engineering and Mechatronics*, Vol. 1, No. 1, pp. 72-79, 2012.
6. Kollar, L. E., Turi, J., Numerical Stability Analysis in Respiratory Control System Models, *Electronic Journal of Differential Equations*, Conference 12, pp. 65-78, 2005. (presented at the *2004 Conference on Differential Equations and Applications in Mathematical Biology*, Nanaimo, BC, Canada) (<http://ejde.math.txstate.edu> or <http://ejde.math.unt.edu>)
7. Kollar, L. E., Stepan, G., Turi, J., Dynamics of Delayed Piecewise Linear Systems, *Electronic Journal of Differential Equations*, Conference 10, pp. 163-185, 2003. (presented at the *Fifth Mississippi State Conference on Differential Equations and Computational Simulations*, Starkville, MS, USA) (<http://ejde.math.swt.edu> or <http://ejde.math.unt.edu>)
8. Kollar, L. E., Somlo, J., Stepan, G., Szabályozott egyensúlyozási rendszer periodikus megoldásai, *Gépgyártástechnológia*, No. 10, pp. 23-27, 2000.
9. Kollar, L. E., Stepan, G., Hogan, S. J., Sampling Delay and Backlash in Balancing Systems, *Periodica Polytechnica Ser. Mech. Eng.*, Vol. 44, No. 1, pp. 77-84, 2000.

Conference papers in proceedings:

1. Alghadhi, M., Ball, A., Kollar, L. E., Mishra, R., Asim, T., Fuel Consumption Tabulation in Laboratory Conditions, *Proc. of International Research Conference on Engineering, Science and Management*, pp. 176-180, Dubai, United Arab Emirates, 2014.
2. Kollar, L. E., Lucas, G. P., Zhang, Z., An Analytical Method for Reconstruction of Velocity Profiles using a Multi - Electrode Electromagnetic Flow Meter, *Proc. 7th World Congress on Industrial Process Tomography (WCIPT7)*, pp. 385-394, Krakow, Poland, 2013.
3. Hefny, R., Farzaneh, M., Kollar, L. E., Simulation of Snow Adhesion on Power Transmission Cables, *Proc. of International Conference on Mechanical Engineering and Mechatronics*, Ottawa, ON, Canada, Paper No. 208, 2012.

4. Hefny, R., Kollar, L. E., Farzaneh, M., Influence of Dynamic Forces on Wet Snow Shedding from Overhead Cables, *Proc. of International Conference on Mechanical Engineering and Mechatronics*, Ottawa, ON, Canada, Paper No. 79, 2012.
5. Kollar, L. E., Farzaneh, M., Influence of Transmission Line Parameters on High-Amplitude Vibration of Conductor Bundles, *Proc. of 10th World Congress on Computational Mechanics*, Sao Paulo, Brazil, Paper 19757, 2012.
6. Kulyakhtin, A., Loset, S., Kollar, L. E., Small-Scale Simulation of Seawater Icing in Natural Field Conditions, *Proc. of 21st IAHR International Symposium on Ice*, Dalian, China, 2012.
7. Kulyakhtin, A., Kollar, L. E., Loset, S., Farzaneh, M., Numerical Simulations of 3D Spray Flow in a Wind Tunnel with Application of O'Rourke's Interaction Algorithm and Its Validation, *Proc. of 21st IAHR International Symposium on Ice*, Dalian, China, 2012.
8. Banitalebi Dehkordi, H., Farzaneh, M., Kollar, L. E., Van Dyke, P., Experimental Study of Spray Characteristics and its Uniformity under Different Icing Conditions, *Proc. of 14th International Workshop on Atmospheric Icing of Structures*, Chongqing, China, Paper P1_32_ID219, 2011.
9. Kollar, L. E., Farzaneh, M., Numerical Modeling and Small-Scale Experimental Simulation of Ice Shedding Propagation on Bundled Conductors, *Proc. of 14th International Workshop on Atmospheric Icing of Structures*, Chongqing, China, Paper B6_3_ID225, 2011.
10. Kollar, L. E., Farzaneh, M., Van Dyke, P., Modeling of Cable Vibration Following Ice Shedding Propagation, *Proc. of 14th International Workshop on Atmospheric Icing of Structures*, Chongqing, China, Paper B5_3_ID224, 2011.
11. Fonyo, A., Kollar, L. E., Farzaneh, M., Montpellier, P., Experimental Simulation of Wet-Snow Shedding from Sagged Cables, *Proc. of 13th International Workshop on Atmospheric Icing of Structures*, Andermatt, Switzerland, 2009.
12. Hefny, R., Kollar, L. E., Farzaneh, M., Peyrard, C., Adhesion of Wet Snow to Different Cable Surfaces, *Proc. of 13th International Workshop on Atmospheric Icing of Structures*, Andermatt, Switzerland, 2009.
13. Olqma, O., Kollar, L. E., Farzaneh, M., Pellet, L., Modeling Wet-Snow Shedding from Current-Carrying Conductors, *Proc. of 13th International Workshop on Atmospheric Icing of Structures*, Andermatt, Switzerland, 2009.
14. Kollar, L. E., Farzaneh, M., A Dynamic Model for Spacers on Triple and Quad Bundles of Conductors, *Proc. of 7th International Symposium on Cable Dynamics*, Paper 71, Vienna, Austria, 2007.
15. Kollar, L. E., Farzaneh, M., The Effects of Droplet Collision, Evaporation, Gravity and Turbulent Dispersion on the Droplet Size Distribution of an Aerosol Cloud under Icing Conditions, *Proc. of 12th International Workshop on Atmospheric Icing of Structures*, Paper 2-3, Yokohama, Japan, 2007.
16. Kollar, L. E., Farzaneh, M., Modeling Spacer Dynamics during Ice-Shedding-Induced Vibrations, *Proc. of 12th International Workshop on Atmospheric Icing of Structures*, Paper 5-3, Yokohama, Japan, 2007.
17. Kermani, M., Farzaneh, M., Kollar, L. E., Estimation of stresses in atmospheric ice during galloping of power transmission lines, *Proc. of 12th International Workshop on Atmospheric Icing of Structures*, Paper 5-2, Yokohama, Japan, 2007.
18. Kollar, L. E., Farzaneh, M., Dynamic Behavior of Cable Systems with Spacers Following Ice Shedding, *Proc. of ICNPAA 2006: 6th International Conference on Mathematical Problems in Engineering and Aerospace Sciences*, Paper 42, pp. 399-406, Budapest, Hungary, 2006.
19. Kollar, L. E., Farzaneh, M., Dynamic Analysis of Overhead Cable Vibrations as a Result of Ice Shedding, *Proc. of 6th International Symposium on Cable Dynamics*, pp. 427-434, Charleston, South Carolina, USA, 2005.
20. Kalman, T., Farzaneh, M., Kollar, L. E., McClure, G., Leblond, A., Dynamic Behavior of Iced Overhead Cables Subjected to Mechanical Shocks, *Proc. of 6th International Symposium on Cable Dynamics*, pp. 339-346, Charleston, South Carolina, USA, 2005.

21. Kollar, L. E., Farzaneh, M., Karev, A. R., The Role of Droplet Collision, Evaporation and Gravitational Settling in the Modeling of Two-Phase Flows under Icing Conditions, *Proc. of 11th International Workshop on Atmospheric Icing of Structures*, Paper IW38, Montreal, Canada, 2005.
22. Kollar, L. E., Farzaneh, M., Modeling the Dynamics of Overhead Cables with Ice, *Proc. of 11th International Workshop on Atmospheric Icing of Structures*, Paper IW37, Montreal, Canada, 2005.
23. Lozowski, E. P., Oleskiw, M. M., Blackmore, R. Z., Karev, A. R., Kollar, L. E., Farzaneh, M., Spongy Icing Revisited: Measurements of Ice Accretion Liquid Fraction in Two Icing Wind Tunnels, *43rd AIAA Aerospace Sciences Meeting and Exhibit*, Paper 2005-658, Reno, NV, USA, 2005.
24. Karev A. R., Farzaneh M., Kollar, L. E., Vaslon, S., Freezing of Water in an Open Channel Flow Under Supercooled Ambient Conditions: Preliminary Results, *Proc. of the 17th International Symposium on Ice*, pp. 379-384, St. Petersburg, Russia, 2004.
25. Karev A. R., Farzaneh M., Kollar, L. E., Vaslon, S., New Dynamic Aspects of Contemporaneous Concepts in Atmospheric Icing Modelling, *Proc. of the 17th International Symposium on Ice*, pp. 413-418, St. Petersburg, Russia, 2004.
26. Kollar, L. E., Stepan, G., Turi, J., Dynamics of Sampled Systems with Backlash, *Proc. of 11th World Congress in Mechanism and Machine Science*, Vol. 3, pp. 1498-1502, Tianjin, China, 2004.
27. Kollar, L. E., Stepan, G., Turi, J., Digital Balancing of Systems with Backlash, *Proc. of 41st IEEE Conference on Decision and Control*, pp. 3106-3111, Las Vegas, Nevada, USA, 2002.
28. Kollar, L. E., Somlo, J., Stepan, G., Periodic Responses of a Controlled Balancing System, *Proc. of VIIIth International Conference on the Theory of Machines and Mechanisms*, pp. 309-314, Liberec, Czech Republic, 2000.
29. Kollar, L. E., Stepan, G., Digital Controlling of Piecewise Linear Systems, *Proc. of 2nd Conference on Control of Oscillations and Chaos*, Vol. 2, pp. 327-330, St. Petersburg, Russia, 2000.
30. Kollar, L. E., Stepan G., Balancing on Inclined Surface, *Proc. of 2nd Conference on Mechanical Engineering*, Vol. 1, pp. 219-223, Budapest, Hungary, 2000.
31. Kollar, L. E., Stepan, G., Hogan, S. J., Backlash in Balancing Systems Using Approximate Spring Characteristics, *Proc. of 3rd European Nonlinear Oscillations Conference*, 2000.
(<http://www2.mat.dtu.dk/people/M.P.Soerensen/ENOC/proceedings/Kollar/>)
32. Kollar, L. E., Stepan, G., Digital Balancing Using Artificial Labyrinth, *Proc. of 5th Conference on Dynamical Systems – Theory and Applications*, pp. 221-225, Lodz, Poland, 1999.
33. Kollar, L. E., Backlash in Machines Stabilized by Control Force, *Proc. of 1st Conference on Mechanical Engineering*, Vol. 1, pp. 147-151, Budapest, Hungary, 1998.
34. Stepan, G., Kollar, L. E., Robotic Balancing Using Artificial Labyrinth, *RoManSy 12, Theory and Practice of Robots and Manipulators*, pp. 443-450, Paris, France, 1998.
35. Kollar, L. E., Stepan, G., Human Balancing with Reflex Delay, *Proc. of 4th Conference on Dynamical Systems – Theory and Applications*, pp. 143-146, Lodz, Poland, 1997.

Scientific reports:

1. Kollar, L. E., Lucas, G. P., Description of Matlab codes for reconstruction of velocity profiles, SERG Internal Report, University of Huddersfield, UK, June 2014.
2. Kollar, L. E., Mishra, R., Inverse Design of Wind Turbine Blades for Extreme Weather Applications, EEERG Internal Report, University of Huddersfield, UK, March 2014.
3. Farzaneh, M. (convenor), Jakl, F. (secretary), Eliasson, A. J., Fikke, S. M., Haldar, A., Isozaki, M., Lake, R., Leblond, A., Minchin, M., Mito, M., Ryerson, C. C., Shkaptsov, V., Wareing, J. B., Anderson, B., Kermani, M., Kollár, L. E., Menini, R., Péter, Z., Volat, C., Systems for prediction and monitoring of ice shedding, anti -icing and de-icing for power line conductors and ground wires, CIGRÉ WG B2.29, Technical Brochure #438, 100 p., December 2010, and Electra Summary, *Electra* #253, pp. 51-57, December 2010.

4. Banitalebi Dehkordi, H., Kollar, L. E., Farzaneh, M., Camirand, P., D'Amours, C., Introduction, Instrumentation and Calibration of CIGELE Atmospheric Icing Research Wind Tunnel (CAIRWT), CIGELE/INGIVRE Internal Report, University of Quebec at Chicoutimi, QC, Canada, 2010.