



# Russell Richman

Ph.D., P.Eng. President richman@rrcl.ca

## Academic Preparation

### Ph.D. (Civil Engineering)

2003–2008

University of Toronto, Department of Civil Engineering

**Program:** Building Science, Sustainable Engineering

**Advisor:** Dr. Kim D. Pressnail

**Selected Courses:** Special Studies in Civil Engineering Systems – Modern Roofing Systems (CIV1299); Wood Products and Processing (FOR1280); Architecture, Technology and Ecology (ARC3041); Technology, Society and the Environment (JEI1901)

**Thesis:** The Solar Dynamic Buffer Zone Curtain Wall – Validation and Design

The research involved creating, building and testing a 'solar dynamic buffer zone' curtain wall system that will function to reduce the energy load for heating a building through near passive techniques.

### M.A.Sc. (Civil Engineering)

1999–2002

University of Toronto; Department of Civil Engineering

**Program:** Building Science, Construction Management, Environmental Engineering

**Advisor:** Dr. Kim D. Pressnail

**Selected Courses:** Management of Building Projects (CIV1281); Case Studies in Building Science (CIV1282); Construction Contract Documents (CIV1279); Special Studies in Civil Engineering – Moisture and Brick (CIV1299)

**Thesis:** Using the Inverse Method to Predict Air Flow in Buildings

- The research involved developing a unique method to analyze and predict a building's air pressure regime. By conducting several field tests and designing a discrete method for air pressure prediction, the estimated leakage areas within building zones could be quantified.

### B.A.Sc. (Civil Engineering)

1995–1999

University of Toronto; Department of Civil Engineering

With honours standing

**Thesis:** The Reduced Gradient Approach Applied to a House Museum

- The research involved monitoring and analyzing the performance of an environmental control method to sustain desired relative humidity levels in order to minimize the degradation of the artefacts within house museums.



## Publications

### Journal Articles

**Richman, R. C.**, O'Malley, L., Pressnail, K. D. and Liebenow, N., "The Reduced Gradient Approach (RGA): An Alternative Method to Optimizing Humidity Conditions in House Museums in Cold Climates", *International Journal of Architectural Heritage*, 2011, vol. 5, issue 1, January, pp. 48-59.

**Richman, R. C.** and Pressnail, K. D., "Laboratory Testing to Quantify Performance of the Solar Dynamic Buffer Zone (SDBZ) Curtain Wall", *Energy and Buildings, Volume 42, Issue 4, April 2010, pp. 522-533.*

**Richman, R. C.**, Cianfrone, C. and Pressnail, K. D., "More Sustainable Masonry Façades: Preheating Ventilation Air Using a Dynamic Buffer Zone (DBZ)", *Journal of Building Physics July 2010 vol. 34 no. 1, pp. 27-41.*

**Richman, R. C.**, Pasqualini, P. and Kirsh, A., "Life Cycle Analysis of Roofing Insulation Levels for Cold Storage Buildings", *Journal of Architectural Engineering, Vol. 15, No. 2, June 2009, pp. 55-61.*

**Richman, R. C.** and Pressnail, K. D., "A More Sustainable Curtain Wall System: Analytical Modelling of the Solar Dynamic Buffer Zone (SDBZ) Curtain Wall", *Building and Environment*, 2009, vol. 44, issue 1, January, pp. 1-10.

Bristow, D., **Richman, R. C.**, Kirsh, A., Kennedy, C., Pressnail, K., "Hour-by-Hour Analysis for Increased Accuracy of Greenhouse Gas Emissions for a Low-Energy Condominium Design", *International Journal of Industrial Engineering*, (Accepted January 2011; available on-line).

Dixon, E., **Richman, R. C.**, Pressnail, K. D., "NTED<sup>TM</sup>: Achieving Significant Reductions in Heating Energy Use", *Energy and Buildings*, (Submitted January 2011; under review).

Fix, S., **Richman, R. C.**, "Towards the Removal of Uncertainty in Sustainable Building Design Through All-Inclusive Parametric Optimization", *International Journal of Building Simulation*, (Submitted February 2011; under review).

### Conference and Other Papers

Blaszak, K., **Richman, R. C.**, "Toward Sustainability: Prioritizing Retrofit Options for Toronto's Single-Family Homes", 13<sup>th</sup> Canadian Conference on Building Science and Technology, Winnipeg, Canada, May 2011.



Fix, S., **Richman, R. C.**, “Brute Force Optimization: Combining Mass Energy Simulation and Life Cycle Analysis to Optimize Building Design”, 13<sup>th</sup> Canadian Conference on Building Science and Technology, Winnipeg, Canada, May 2011.

Dixon, E., **Richman, R. C.**, Pressnail, K. D., Touchie, M., “NTED<sup>TM</sup>: Applicability of an Innovative Low-Energy Home Design to Northern Climates”, 13<sup>th</sup> Canadian Conference on Building Science and Technology, Winnipeg, Canada, May 2011.

Touchie, M., Pressnail, K. D., Dixon, E., **Richman, R. C.**, “Overcoming the Challenges of Energy Retrofitting an Historic 1870’s Solid Masonry Home: A Case Study”, 13<sup>th</sup> Canadian Conference on Building Science and Technology, Winnipeg, Canada, May 2011.

Bowick, M., **Richman, R. C.**, “Life Cycle Energy Use and Greenhouse Gas Emissions of Residential Dwellings”, International Conference on Building Envelope Systems and Technologies, Vancouver, Canada, June 2010.

Fix, S, and **Richman, R. C.**, “Viability of Rammed Earth Building Construction in Cold Climates”, 2009, Ryerson University, Canada.

Dixon, E., **Richman, R.C.**, Pressnail, K. D., Touchie, M., “Gemini House: An Innovative Design Using Nested Thermal Envelopes to Achieve Significant Reductions in Energy Use”, Thermal Performance of the Exterior Envelopes of Whole Buildings XI International Conference, December 5-9, 2010, Clearwater Beach, Florida.

Cianfrone, C., **Richman, R.C.**, and Pressnail, K.D., “Using Solar Dynamic Buffer Zone Walls to Increase Performance of Air Source Heat Pumps in Cold Climates”, Building Enclosure Science and Technology II, 2010, Portland, Oregon.

Ng, K.L., Wong, E.S.W., **Richman, R.C.**, and Liao, Z., “Evaluating the Potentials of Variable Air Volume Systems in North American Houses”, 10<sup>th</sup> Asia Pacific Conference on the Building Environment, 2010.

Caesar, D., **Richman, R.C.**, and Pressnail, K.D., “Design and Construction of an Effective Window Wall System in High Rise Condominiums: A Case Study”, International Conference on Tall Buildings, Hong Kong, 2010.

**Richman, R.C.**, Pressnail, K.D. and Kirsh, A. “Moderating the Impact of Sustained Energy Interruptions by Designing and Constructing Low Energy Homes”, 2009 Passive and Low Energy Architecture International Conference.



Bristow, D., **Richman, R.C.** Kirsh, A., Kennedy, C. and Pressnail, K.D., “Hour by Hour Analysis of Greenhouse Gas Emissions for a Near-Zero Carbon Condominium Design”, International Society for Industrial Engineering 2009 Conference. Lisbon, Portugal.

Pressnail, K.D., Kirsh, A.M. and **Richman, R.C.**, “Low Energy Homes: The Economic Case for Building More Responsibly Now”, 12th Canadian Conference on Building Science and Technology (CCBST), May 6-8, 2009, Montreal, Canada.

**Richman, R.C.** Pressnail, K.D., Cianfrone, C. “More Sustainable Masonry Façades: Preheating Ventilation Air Using a Dynamic Buffer Zone (DBZ)”, 12th Canadian Conference on Building Science and Technology (CCBST), May 6-8, 2009, Montreal, Canada.

Rowe, D.J., Pressnail, K.D., **Richman, R.C.**, “Evaluating the Performance of a Double Façade in a Cold Climate: A Case Study”, 12th Canadian Conference on Building Science and Technology (CCBST), May 6-8, 2009, Montreal, Canada.

Pressnail, K.D., **Richman, R.C.** Kirsh, A., “An Innovative Approach to Low-Energy Building Performance Using Nested Thermal Envelopes”, 12th Canadian Conference on Building Science and Technology (CCBST), May 6-8, 2009, Montreal, Canada.

Illaszewicz, G.L., Pressnail, K.D., **Richman, R.C.**, “A Study of Thermal Insulation Practices in the Arctic of Canada”, 12th Canadian Conference on Building Science and Technology (CCBST), May 6-8, 2009, Montreal, Canada.

**Richman, R.C.** and Pressnail, K.D., “The Solar Dynamic Buffer Zone (SDBZ) Curtain Wall: Theory and Simulation”, Building Enclosure Science and Technology 1, Minneapolis, MN., 2008.

Pressnail, K.D., Kirsh, A.M. and **Richman, R.C.**, “Moderating the Impact of Sustained Energy Interruptions Through the Design and Construction of Low-Energy Homes”, International Society for Industrial Ecology Annual Conference, 2007, Toronto, Ontario, Canada.

- Conference presenter

Pressnail, K.D. and **Richman, R. C.**, “Exterior Basement Insulation: Further Proof of the Need to Build Better Now”, 2007, National Building Envelope Conference, Banff, Alberta, Canada.

- Conference presenter



**Richman, R. C.** and Pressnail, K.D., “More Sustainable Curtain Wall Systems: Using a Solar Dynamic Buffer Zone to Reduce Energy Costs”, 2006, The 2006 Annual General Conference of the Canadian Society for Civil Engineering, Calgary, Alberta, Canada.

- Conference presenter

Gray, S., **Richman, R.C.**, Pressnail, K.D. and Dong, B, “Low Energy Homes: Evaluating the Economic Need to Build Better Now”, 2005, 33rd Annual General Conference of the Canadian Society for Civil Engineering, Toronto, Ontario, Canada.

- Received conference award for best general paper

**Richman, R.C.** and Pressnail, K.D., “Further Validation of the Inverse Method for Prediction of Air Flow in Buildings”, 2005, 1<sup>st</sup> Canadian Conference on Effective Design of Structures, Hamilton, Ontario, Canada.

- Conference presenter

## Grants/Awards Received

NSERC Engage Grant (National)	2011
NCE: MITACS (Provincial)	2011
Ontario Power Authority Technological Development Fund (Provincial)	2010-2011
NSERC Discovery Grant (National)	2009-2014
Ryerson New Faculty SRC Award (Institutional)	2009
Department of Civil Engineering Bronze Faculty Teaching Award (Institutional)	2007
Civil Engineering Chair’s Award for Excellence in Research (Institutional)	2006
Ontario Graduate Scholarship for Science and Technology (Provincial)	2005, 2006
CSCE General Conference Paper Award (National)	2005
NSERC Post Graduate Scholarship PGS B (National)	2003, 2004
NSERC Industrial Post Graduate Scholarship IPS 1 (National)	2000, 2001
J. W. and H. G. Tyrell Memorial Scholarship (Institutional)	1998, 1999
• For undergraduate academic excellence	
Faculty Member Scholarship (Institutional)	1996, 1997, 1998, 1999



## Experience/Employment

### Research Experience

**Research Interests** – building science (building physics), building envelope systems, sustainable buildings, responsible engineering, energy efficiency, low impact housing, occupant behaviour.

#### **Assistant Professor**

**August 2008-present**

Ryerson University, Toronto  
Department of Architectural Science  
Faculty of Engineering, Architecture and Science

- Started the Sustainable Buildings Group.
- Graduated 3 masters students (M.A.Sc.) to date.

#### **Ph.D. Graduate Student**

**2003-2008**

University of Toronto, Department of Civil Engineering, Sustainable Buildings Group  
Supervisor: Professor K. D. Pressnail

- Completed doctoral research in the area of building science. Expertise includes window and curtain wall systems, heat and moisture flow, sustainable buildings.
- Designed and constructed a solar dynamic buffer zone curtain wall system utilizing full scale samples.
- Developed and performed testing to quantify the energy efficiency of the system using a climate simulator in a laboratory setting and all associated software/procedures.
- Performed order of magnitude computer analysis utilizing several building energy analysis programs.

#### **M.A.Sc. Graduate Student**

**1999-2002**

University of Toronto, Department of Civil Engineering, Centre for Building Science  
Supervisor: Professor K. D. Pressnail

- Completed master's research in the area of building science. Expertise includes building airflow analysis and simulation.
- Performed computer analysis using available building air flow analysis software to verify simulation technique.
- Designed and performed field tests on several residential dwellings to collect data for computer analysis.

#### **Research Assistant**

**2000**

University of Toronto, Department of Civil Engineering

- Assisted in structural testing of a mortise and tenon style timber connector.
- Analysis of test data to verify performance of the connector in accordance with industry and ASTM standards.



### **Research Assistant**

**1999**

University of Toronto, Department of Civil Engineering, Concrete Materials Group

Supervisor: Professor R. D. Hooton

- Assisted a Ph.D. student with experiments involving long term expansion effects of mortar exposed to salt solutions.

### **Undergraduate Research**

**1998-1999**

University of Toronto, Department of Civil Engineering

Supervisor: Professor K. D. Pressnail

- Application of a unique interior climate control approach to mitigate deleterious effects of artefacts in house museums.
- Extended field monitoring of a house museum to collect data to verify the Reduced Gradient Approach

## **Related Teaching Experience**

**Teaching Interests** – expertise in building science, building envelope, building simulation and sustainable design; excellence in construction, statics and surveying.

### **Assistant Professor**

**August 2008-present**

Ryerson University, Toronto

Department of Architectural Science

Faculty of Engineering, Architecture and Science

- Key faculty member in the graduate program in Building Science.
- Delivery of various courses/design studios in undergraduate and graduate programs (684 contact hours).

### **Course Instructor**

**2007/2008**

University of Toronto, Department of Civil Engineering

Course: CIV425Y – Design Project (100 contact hours – 10 to 15 students)

#### Responsibilities

- Facilitated the fourth year design project through seminar style studios highlighting various case-studies and design oriented discussion.

### **Course Instructor**

**2004, 2006**

University of Toronto, Department of Civil Engineering

Course: CIV101 – Structures, Materials & Design (55 contact hours – 90 students)

#### Responsibilities

- Performed all regular duties of a course instructor including lecturing, creating assignments and term tests, teaching assistant management and student mentoring.





**Co-instructor**

**2000-2001, 2003-2006**

University of Toronto, Department of Civil Engineering

Course: CIV358 – Survey Camp (400 contact hours – 60 students)

Responsibilities

- Prepared and delivered 1/3 of the course to undergraduate students in a field camp setting (i.e. lectures and field work supervision).

**Course Coordinator (2005-2010)/Instructor (2004)**

**2004-2006**

University of Toronto, Professional Development Centre/School of Continuing Studies

Course: Building Science II (60 contact hours – 20 students)

Responsibilities

- Performed all regular duties of a course coordinator including course syllabus, development, exam creation, lecturing and administrative duties.

**Instructor**

**2004, 2005**

University of Toronto, DaVinci Engineering Enrichment Program (DEEP)

Course: Building Science and Forensic Engineering (60 contact hours – 25 students)

Responsibilities

- Creation of the course from concept to delivery including lectures, labs and other hands-on activities.

**Teaching Assistant**

**1997 (B.A.Sc. Year 3) - present**

University of Toronto, Department of Civil Engineering

Courses: CIV255 – Surveying

CIV320 – Introduction to the Management of Construction

CIV340 – Municipal Engineering

CIV420 – Construction Management

CIV575 – Building Science (undergraduate/graduate course)

CIV1282 – Case Studies in Building Science (graduate course)

Responsibilities

- Performed all regular duties of a T.A. including occasional lectures, tutorials, office hours and marking.

## Invited Engagements

13<sup>th</sup> Canadian Conference on Building Science and Tech. – Session Chair      May 2011

University of Toronto, Department of Civil Engineering – Lecture      February 2011

Ontario Building Envelope Council – Lecture      April 2007





## Academic Reviewer

BTES Conference 2011 (international)	May 2011
Journal of Building Simulation (international)	April 2011
13 <sup>th</sup> CCBST (national conference)	March 2011
NSERC Discovery Grant Program (national)	February 2011
NSB 2011 Finland (international conference)	January 2011
Leaders of Opportunity Fund (national)	August 2010

## Related Professional Experience

### **President** **2005-present**

Russell Richman Consulting Ltd.

- Building science consulting and engineering teaching services

### **Project Manager/Curtain Wall Specialist** **2004-2005**

Yolles Partnership Inc.

- Curtain wall consultant to the Canadian Federal Government for design and construction of a new embassy in Seoul, South Korea.
- Project lead on several Property Condition Assessments across North America.

### **Intermediate Engineer/Building Envelope Specialist** **2000-2003**

Yolles Partnership Inc.

- Responsible for managing projects while providing investigation, design, contract administration and client services.

### **Surveyor – Rodman** **1999**

City of Toronto, Engineering Survey Department

- Facilitated land surveying applications such as public transit track replacement, road and sidewalk replacement and topographic surveys.

## Professional Academic and Administrative Experience

### **Scholarly Research Committee (Committee Chair)** **2009-present**

Ryerson University, Department of Architectural Science

### **Information Technology Committee** **2009-present**

Ryerson University, Department of Architectural Science

### **Prospective Professors in Training (PPIT) Program** **2006, 2007**

University of Toronto, Faculty of Applied Sciences and Engineering



**Academic Planning Committee Graduate Student Representative 2005, 2006, 2007**  
University of Toronto, Department of Civil Engineering

**Departmental Council Graduate Student Representative 2005, 2006, 2007**  
University of Toronto, Department of Civil Engineering

**Graduate Student Reference 2005**  
University of Toronto, Department of Civil Engineering  
• Professor Bill Vanderburg's promotion to full professor.

**Representative 2005**  
Ontario Ministry of Agriculture, Food and Rural Affairs  
• Ontario Rural Research Services Committee Annual Meeting

**Vice-President & Co-founder 2003-2004**  
• University of Toronto Chopper Bicycle Club,

**Vice President 1998-1999**  
• Civil Engineering Club, University of Toronto

## Other Experience

**Withrow Park Ball Hockey League, 1990-1996**  
• Coordinator

**York Central Men's Ball Hockey League, 1995-2000**  
• Referee

**North York Hydro, 1997**  
• Land Surveyor

**Morrison Hershfield Consulting Engineers, 1998**  
• Engineer in training

## Professional Affiliations

Professional Engineers of Ontario

Ontario Building Envelope Council

American Society of Heating, Refrigeration and Air-conditioning Engineers



## Hobbies, Interests, Etc.

Canoe building	Reading
Back country and white water canoeing	Hockey
Carpentry	Alpine skiing
Residential renovation	

## Volunteer Experience

University of Toronto, Department of Civil Engineering • Ontario Universities Fair Representative	<b>2006</b>
University of Toronto, Department of Civil Engineering • Graduate student buddy	<b>2003-present</b>
University of Toronto, Faculty of Arts and Science • Gifted High School Student Conference – Special Lecturer	<b>2005</b>
University of Toronto, Department of Civil Engineering • Career fair – graduate student representative	<b>2003, 2004</b>
Everdale Organic Farm • Technical advisor	<b>2005-present</b>
Toronto Humane Society • Small domestics care-giver	<b>2004-present</b>
Karma Co-operative • Building maintenance committee	<b>2003–2004</b>
Children’s Aid Society (Toronto) • Special friend	<b>2000–2001</b>
Habitat for Humanity • Site Planning and residential construction	<b>1999</b>