

Eric JACQUES, Ph.D., P.Eng.

Curriculum Vitae
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CONTACT INFORMATION

The Charles E. Via, Jr. Department of Civil & Environmental Engineering
Virginia Polytechnic Institute and State University
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PROFESSIONAL APPOINTMENTS/EMPLOYMENT

- 2017- **Assistant Professor**, The Charles E. Via, Jr. Department of Civil & Environmental Engineering, Virginia Tech, Blacksburg, VA, USA
- 2017-2016 **Part-Time Professor**, Department of Civil Engineering, University of Ottawa, Ottawa, Canada
- 2017-2015 **Assistant Research Officer/Research Associate**, Civil Engineering Infrastructure Group, National Research Council of Canada, Ottawa, Canada
- 2015- **Co-founder**, SJ Infrastructure Protection, Ltd., Ottawa, Canada
- 2015-2010 **Research Assistant & Blast Expert**, Department of Civil Engineering, University of Ottawa, Ottawa, Canada

EDUCATION

- 2016-2011 **Ph.D.**, Department of Civil Engineering, University of Ottawa
Thesis: *Characteristics of Reinforced Concrete Bond at High Strain Rates*
Supervisor: Dr. Murat Saatcioglu
- 2011-2009 **M.A.Sc.**, Department of Civil Engineering, University of Ottawa
Thesis: *Blast Retrofit of Reinforced Concrete Wall and Slabs*
Supervisor: Dr. Murat Saatcioglu
- 2008-2004 **B.A.Sc.**, Department of Civil Engineering, University of Ottawa

RESEARCH EXPERIENCE

National Research Council of Canada

- | | |
|-----------|---|
| 2017 | Development of preliminary and semi-quantitative seismic risk decision frameworks for existing buildings in Canada.
PI: R. Fathifazl |
| 2017-2016 | Development of a framework and design guidelines to address the climate change resilience of core public infrastructure in Canada.
PI: Z. Lounis |
| 2016-2015 | Structural assessment and material characterization of lightweight aerated interlocking concrete building blocks.
PI: E. Jacques |
| 2017-2015 | Development of reliability-based design requirements for structural insulated panels (SIPs).
PI: J. Makar |
| 2017-2015 | Short- and long-term structural behavior and durability characteristics of structural insulated panels (SIPs).
PI: J. Makar |
| 2015 | Development of a R&D plan to demonstrate use of lightweight aerated concrete blocks as a substitute to conventional masonry construction.
PI: E. Jacques |

University of Ottawa

Post-Graduate Research

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| 2016- | Computer software for blast-resistant window anchor design |
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Graduate Research Projects

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| 2016-2011 | Characteristics of reinforced concrete bond at high strain rates (Ph.D.) |
| 2010-2009 | Blast retrofit of reinforced concrete walls and slabs (M.A.Sc.) |

Client-Driven Applied Research Projects

PI: M. Saatcioglu

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| 2017-2015 | Development of blast-resistant window anchor systems |
| 2015 | Blast testing of "GuardianCoil" protection system against flying debris |
| 2014 | R&D for a proprietary interlayer blast window protection system |
| 2014-2012 | Steel blast door development for the minimum antiterrorism market |
| 2013 | Blast testing of a proprietary window protection system |

2012	Hazard assessment of a historic sash window protection system
2012	Blast vulnerability assessment of the East Block of Parliament Hill
2011	In-situ assessment of a dynamic mine shaft cable testing apparatus
2011	Quantify high strain rate material properties of spruce-pine-fir studs
2011	Testing and analysis of a proprietary GFRP blast retrofit system

PUBLICATIONS

Book Chapters

- A1. Saatcioglu, M., and **Jacques, E.**, (2018) “Annex A – Two-degree-of-freedom analysis of window systems for anchor design and design software BRADS,” in: CSA S852 Blast Resistant Window Anchor Systems, Canadian Standards Association, Toronto, Canada.

Refereed journal articles

- B1. **Jacques, E.** and Makar, J. “Shear Response of Structural Insulated Panels (SIPs) Subjected to Short-term Out-of-plane Lateral Loads”, Canadian Journal of Civil Engineering, Manuscript ID cjce-2018-0015, ACCEPTED FOR PUBLICATION.
- B2. Fathi-Fazl, R., **Jacques, E.**, Kadhom, B., Saassouh, B., and Motazedian, D., (2018) “Development of a Preliminary Seismic Risk Screening Tool for Existing Buildings in Canada”, Canadian Journal of Civil Engineering, Vol. 45, No. 9, pp. 717-727 (dx.doi.org/10.1139/cjce-2017-0504).
- B3. **Jacques, E.**, and Saatcioglu, M., (2016) “Blind Simulation of Blast Loaded Slabs Using RCblast Software,” Analytical and Finite Element Concrete Material Models – Comparison of Blast Response Analysis of One-Way Slabs with Experimental Data, SP-306, Thiagarajan, G., and Williamson, E. (eds.), American Concrete Institute, Farmington Hills, Mich.
- B4. **Jacques, E.**, Lloyd, A., Imbeau, P., Palermo, D., Quek, J., (2015) “GFRP Retrofitted Reinforced Concrete Columns Subjected to Simulated Blast Loading,” ASCE Journal of Structural Engineering, 10.1061/(ASCE)ST.1943-541X.0001251, 04015028
- B5. **Jacques, E.**, Lloyd, A., Braimah, A., Saatcioglu, M., Doudak, G., and Abdelalim, O., (2014) “Influence of high strain-rates on the dynamic flexural material properties of spruce-pine-fir wood studs,” Canadian Journal of Civil Engineering, 41:56-64
- B6. **Jacques, E.**, Lloyd, A., and Saatcioglu, M., (2012) Predicting Reinforced Concrete Response to Blast Loads, Canadian Journal of Civil Engineering, Special Issue on “Innovation and IT,” 40:727-444

- B7. Lloyd, A., **Jacques, E.**, Saatcioglu, M., Palermo, D., Nistor, I., and Tikka, T., (2011) "Capabilities of a Shock Tube to Simulate Blast Loading on Structures", Behavior of Concrete Structures Subjected to Blast and Impact Loadings, SP-281, Thiagarajan, G., Williamson, E., and Conley, C. (eds.), American Concrete Institute, Farmington Hills, Mich., 2011, pp. 42-61

Journal articles under review

- C1. **Jacques, E.** and Makar, J. "Behavior of Structural Insulated Panels (SIPs) Subjected to Short-term Axial Loads", ASCE Journal of Structural Engineering, Manuscript ID STENG-6860.
- C2. C3. **Jacques, E.**, and Saatcioglu, M. "Compression membrane analysis for reinforced concrete members subjected to extreme loads", ASCE Journal of Structural Engineering, Manuscript ID STENG-7499.
- C3. **Jacques, E.**, and Saatcioglu, M. "High strain rate response of reinforced concrete beam-ends", International Journal of Impact Engineering, Manuscript ID IE_2018_823.

Theses

- D1. **Jacques, E.**, (2016) "Bond Characteristics of Reinforced Concrete at High Strain-Rates," Ph.D. Thesis, Department of Civil Engineering, University of Ottawa, Ottawa, Canada, pp. 345
- D2. **Jacques, E.**, (2011) "Blast Retrofit of Reinforced Concrete Walls and Slabs," M.A.Sc. Thesis, Department of Civil Engineering, University of Ottawa, Ottawa, Canada, pp. 288

Selected conference papers

- E1. **Jacques, E.**, and Saatcioglu, M. (2018) "Computer Software for the Design of Blast Resistant Window Retention Anchors", Proceedings of the 6th International Disaster Mitigation Specialty Conference, Canadian Society of Civil Engineers, Fredericton, Canada, June 2018.
- E2. **Jacques, E.**, Lloyd, A., Berry, T., Saatcioglu, M., and Shinder, J. (2015) "Development of Blast Resistant Steel Doors", Proceedings of the 11th International Conference on Shock and Impact Loads on Structures, Ottawa, Ontario, May 2015
- E3. **Jacques, E.**, Lloyd, A., Saatcioglu, M., (2013) "ACI Blast Blind Simulation Using RCblast Software," Proceedings of the Blast Blind Prediction of Reinforced Concrete Slabs Subjected to Blast Loading presented at the Fall 2013 ACI Convention in Phoenix, Arizona
- E4. Saatcioglu, M., Lloyd, A., **Jacques, E.**, Anvari, H., Ciornei, L., Tikka, T. (2011) "Blast Retrofit of Building Components," KEYNOTE PAPER, Proceedings of

the 9th International Conference on Shock and Impact Loads on Structures, Fukuoka, Japan, Nov. 2011

- E5. **Jacques, E.**, and Saatcioglu, M., (2011) “Considerations for Design of FRP Retrofitted Reinforced Concrete Wall Panels Subjected to Blast Loading,” Fourth International Conference on Durability and Sustainability of Fibre Reinforced Polymer (FRP) Composites for Construction and Rehabilitation, Quebec City, Canada, July, 2011
- E6. **Jacques, E.**, and Saatcioglu, M., (2011) “SDOF Analysis of Structures for Blast Resistant Design,” 2nd International Engineering Mechanics and Materials Specialty Conference, Ottawa, Canada, June, 2011
- E7. Lloyd, A., **Jacques, E.**, Abdelalim, O., Saatcioglu, M., Braimah, A., and Doudak, G., (2011) “High Strain-Rate Effects on the Dynamic Material Properties of Wood Beams.” 2nd International Engineering Mechanics and Materials Specialty Conference, Ottawa, Canada, June, 2011
- E8. **Jacques, E.**, Saatcioglu, M., and Lloyd, A., (2009) “Performance of CFRP Retrofitted Reinforced Concrete Slabs Under Blast Shock Waves,” 8th International Conference on Shock and Impact Loads on Structures, Adelaide, Australia. December, 2009
- E9. Lloyd, A., Saatcioglu, M., Tikka, T., and **Jacques, E.**, (2009) “Performance of Reinforced Concrete Columns Under Simulated Blast Loading,” 8th International Conference on Shock and Impact Loads on Structures, December, 2009

Manuscripts in preparation

- F1. Fathi-Fazl, R. Kadhom, K. Cai, Z., **Jacques, E.**, Identification of benchmark construction year for seismic risk screening of existing buildings in Canada.
- F2. Saatcioglu, M., and **Jacques, E.** “Design of window retention anchors for blast loads”
- F3. Alameer, A., Elnabelsy, G., **Jacques, E.**, Saatcioglu, M. and Foo, S. “Performance of window retention anchors during shock tube tests”
- F4. **Jacques, E.**, and Fathi-Fazl, R. “Development of a semi-quantitative seismic risk screening tool for existing buildings in Canada”
- F5. **Jacques, E.**, and Saatcioglu, M. “Behaviour of reinforced concrete lap splices subjected to high strain rates”
- F6. **Jacques, E.**, and Saatcioglu, M. “Bond strength of reinforced concrete at high strain rates”

Technical Reports

- G1. Makar, J., **Jacques, E.**, Di Leonardo, B., and Masson, J.F., (2017). “Technical Guide for Structural Insulated Panels for Walls and Roofs”, Canadian

- Construction Materials Centre, National Research Council Canada, Ottawa, Canada, 131 pages.
- G2. Saatcioglu, M., Alameer, A., Elnabelsy, G., **Jacques, E.**, Abdullah, A. (2017). "Deliverable 8.3: Evaluation of Experimental Data for Windows Tested on Reinforced Concrete, Steel, Block Masonry and Stone Masonry Substrates; Development of Blast-Resistant Window Anchor Systems." Report submitted to Public Works and Government Services Canada, Hazard Mitigation and Disaster Management Research Centre, University of Ottawa, Ottawa, Canada.
- G3. Saatcioglu, M., and **Jacques, E.** (2017) "Analysis and design of blast-resistant window retention anchors", Research Report, Hazard Mitigation and Disaster Management Research Centre, University of Ottawa, Ottawa, Canada.
- G4. Fathi-Fazl, R., **Jacques, E.**, Kadhom, B., Saassouh, B., and Singh, J. (2017) "Volume II: Semi-Quantitative Seismic Risk Screening Tool for Existing PSPC Buildings", Report Submitted to Public Services and Procurement Canada, National Research Council of Canada, 125 pp.
- G5. Fathi-Fazl, R., **Jacques, E.**, Kadhom, B., Saassouh, B., and Singh, J. (2017) "Volume I: Development of a Preliminary Seismic Risk Screening Tool for Existing PSPC Buildings", Report Submitted to Public Services and Procurement Canada, National Research Council of Canada, 128 pp.
- G6. **Jacques, E.**, and Seica, M. (2016) "Blast Vulnerability Assessment, South Station Phase I", Client Report, Explora Security A&E, Inc., 256 pp.
- G7. **Jacques, E.**, (2016) "Experimental Tests to Support CCMC Evaluation of Lightweight Aerated Concrete Construction Block Products", Report Submitted to LiteBuilt Concrete Canada, National Research Council of Canada, 30 pp.
- G8. **Jacques, E.**, and Saatcioglu, M. (2015) "Blast Vulnerability Assessment of [Redacted] Parking Garage", Report Submitted to United Talmud Torahs of Montreal, SJ Infrastructure Protection Ltd., 71 pp.
- G9. Castonguay, S., **Jacques, E.**, and Saatcioglu, M. (2015) "Blast Testing of GuardianCoil as a Protection System", Report Submitted to Department of Foreign Affairs, Trade and Development Canada, University of Ottawa, 57 pp.
- G10. **Jacques, E.** (2015) "Product Realization Plan for LiteBuilt Concrete Canada", Report Submitted to LiteBuilt Concrete Canada, National Research Council of Canada.
- G11. **Jacques, E.**, Lloyd, A., Saatcioglu, M. (2014) "Blast Compliance Test Reports," Test Reports Submitted to AMBICO Ltd., University of Ottawa, 436 pp.
- G12. Saatcioglu, M, Lloyd, A., and **Jacques, E.**, (2012) "Blast Assessment of East Block of Parliament Hill", Report Submitted to Baker Engineering and Risk Consultants, University of Ottawa, 167 pp.

- G13. Saatcioglu, M., Lloyd, A., and **Jacques, E.**, (2012) “Blast Testing of DFAIT Window Assemblies,” Report Submitted to Department of Foreign Affairs and International Trade, Hazard Mitigation and Disaster Management Research Center, University of Ottawa, February 2012, 90 pp.
- G14. **Jacques, E.**, and Saatcioglu, M. (2011) “Effect of High Strain Rate on Reinforced Concrete Structures,” Research Report, Hazard Mitigation and Disaster Management Research Center, University of Ottawa, November 2011, 25 pp.
- G15. Palermo, D., Imbeau, P., **Jacques, E.**, and Lloyd, A. (2011) “Fyfe Column Blast Testing Research Report,” Final Report, University of Ottawa, 149 pp.
- G16. Saatcioglu, M., Lloyd, A., **Jacques, E.**, Braimah, A., and Doudak, G., (2011) “Focused Research for Development of a CSA Standard on Design and Assessment of Buildings Subjected to Blast Loads,” Report Submitted to Public Works and Government Services Canada, University of Ottawa, 122 pp.
- G17. **Jacques, E.**, Lloyd, A., and Saatcioglu M., (2010) “Rapid Blast Screen Application (RBSA) Pressure-Impulse (PI) Diagram Explanatory Notes,” Report Submitted to Public Works and Government Services Canada, University of Ottawa, 151 pp.

Other publications

- H1. **Jacques, E.** (2017) BRADS (Blast Resistant Anchor Design Software). Software Technical Manual and User’s Guide.
- H2. Lloyd, A., and **Jacques, E.**, (2011) “Innovative and Cost Effective Blast Strengthening of Wood Framed Structures,” 2011 National Security Innovation Competition, Colorado Springs, USA, April 2011, 5 pp.
- H3. **Jacques, E.**, and Lloyd, A., (2010) “The Use of Advanced Composite Technology for Mitigating Blast Risk in Structures,” 2010 National Security Innovation Competition, Colorado Springs, USA, May 2010, 5 pp.

Software Intellectual Properties

- I1. BRADS (2018) – A computer program for the analysis and design of anchoring systems used in blast-resistant punched windows. The software is available as a free download and is accompanied by an End-User License Agreement, help manual, and tutorial video. <http://www.ericjacques.com/software/brads/>
- I2. RCblast (2013) – A free computer program for inelastic SDOF analysis of reinforced concrete structures subjected to blast-induced shock waves. The software has been downloaded almost 6500 times and is used by students, academics, and industry professionals worldwide. <http://www.rcblast.ca/>

AWARDS AND HONORS

- 2013 **1st Place Winner** (NSC-SDOF Category) and **2nd Place Winner** (HSC-SDOF Category) **Blast-Blind Simulation Contest**, sponsored by American Concrete Institute (ACI) Committees 447 (Finite Element of Reinforced Concrete Structures) and 370 (Blast and Impact Load Effects), and UMKC School of Computing and Engineering.
- 2013 **Best Graduate Seminar Presentation Award**, Department of Civil Engineering, University of Ottawa.
- 2011 **1st Prize at the National Security Innovation Competition** for “Innovative and Cost Effective Blast Strengthening of Wood Framed Structures”, National Homeland Defense Foundation, Colorado Springs (Co-Recipient with Alan Lloyd).
- 2011 Recipient of the **2011 University of Ottawa Commission on Graduate Studies in Sciences Prize**, awarded for an outstanding Master’s thesis in the Sciences.
- 2010 **1st Prize at the National Security Innovation Competition** for “Use of Advanced Composite Technology for Mitigating Blast Risk in Structures”, Colorado Homeland Defense Alliance, Colorado Springs (Co-Recipient with Alan Lloyd).

GRANTS AND SCHOLARSHIPS

- 2017 **Postdoctoral Fellowship Program (PDF) Award** [Declined], Natural Sciences and Engineering Research Council of Canada (NSERC).
- 2013-2011 **Postgraduate Scholarship-Doctoral (PGS-D) Award**, Natural Sciences and Engineering Research Council of Canada (NSERC).
- 2010 **Canada Graduate Scholarship-Master’s (CSG-M) Award**, Natural Sciences and Engineering Research Council of Canada (NSERC).

INVITED TALKS

- 2018 “Overview of Experimental Blast Research”, Technische Universität Dresden, Dresden, Germany, March 8.
- 2017 “Workshop on the Design of Blast Resistant Window Systems”, Public Services and Procurement Canada Information Session on Blast Resistant Window Systems, Ottawa, Ontario, June 19.
- 2017 “Development of a Technical Guide for the Evaluation of Structural Insulated Panels (SIPs) for National Building Code Compliance”, National Research Council of Canada, Construction Town Hall, Ottawa, Ontario, January 17

- 2016 “Introduction to Explosions”, Royal Military College of Canada, Kingston, Ontario, May 27
- 2015 “Bond Characteristics of Reinforced Concrete at High Strain-Rates”, Presented at the 11th International Conference on Shock and Impact Loads on Structures, Ottawa, Ontario, May 15
- 2015 “Collaborative Opportunities for Development of an Integrated Blast Risk Assessment Tool”, Presented at GEXCON AS Software Development Workshop, Bergen Norway, February 9-11

TEACHING EXPERIENCE

Courses Taught

- Reinforced Concrete Structures, Virginia Tech: Spring 2018
- Intermediate Reinforced Concrete Structures, Virginia Tech: Fall 2017, Fall 2018
- Mécanique des Matériaux I (French & HYBRID), University of Ottawa: Winter 2017
- Théorie des Structures I (French) University of Ottawa: Fall 2016
- Civil Engineering Capstone Design Project, University of Ottawa: 3 times 2013-2014

TEACHING AREAS

Protective design of structures, reinforced concrete analysis and design, dynamics of structures, structural analysis, numerical methods, computer programming, and other core civil engineering courses.

SERVICE TO THE PROFESSION

International

- 2018 - Invited expert, GRK2250, “Mineral-bonded composites for enhanced structural impact safety”, TU Dresden, Germany.

Journal Reviewer

- 2017 - International Journal of Computational Methods
- 2016- ASCE Journal of Structural Engineering
- 2016- Canadian Journal of Civil Engineering
- 2014 American Concrete Institute (ACI) Special Publication SP-306

Standards Development & Committee Membership

- 2017- American Concrete Institute Committee 370, Design for Blast and Impact (Voting Member)
- 2017- American Concrete Institute Committee 408, Bond and Development of Steel Reinforcement (Associate Member)

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| 2017- | Canadian Standards Association CSA S850, Design and assessment of buildings subjected to blast loads (Voting Member) |
| 2015- | Canadian Standards Association CSA S852, Blast resistant window anchor systems (Voting Member) |

DEPARTMENTAL/UNIVERSITY SERVICE

- 2014-2012 Member, University of Ottawa Structures Lab Safety Committee

MEDIA COVERAGE

- | | |
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| 2014 | Discovery Channel Daily Planet “Protecting Buildings against Blast (unofficial title)”, First Aired February 20, 2014, Length: 6:49 min. Video available online: http://tinyurl.com/jgtxwhk |
| 2012 | CBC Ottawa, “uOttawa Shock Tube Testing Facility (unofficial title)” First Aired May 16, 2014, Length: 2:57 min (approx.) |
| 2010 | A-Channel Ottawa, “Blast Research,” First Aired June 16, 2010. |

NON-ACADEMIC & RESEARCH WORK EXPERIENCE

- | | |
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| 2015- | Co-founder of SJ Infrastructure Protection, Ltd., specializing in improving the physical security and resilience of infrastructure. |
| 2012- | Consulting with various companies and government agencies in the field of protective design to resist the effects of bomb blast. |

LANGUAGES

- English, Fluent
French, Intermediate

PROFESSIONAL MEMBERSHIPS/AFFILIATIONS

- | | |
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| 2017- | American Concrete Institute (ACI) |
| 2017- | American Society of Civil Engineers (ASCE) |
| 2016- | Professional Engineer (P.Eng.), Professional Engineers Ontario |