Luc Paquette

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Languages : French, English

Research interests

Intelligent tutoring systems, educational data mining, knowledge engineering, gaming the system, student behavior detection, knowledge assessment, pedagogical interventions, pedagogical strategies, knowledge representations, authoring frameworks, task selection, optimizing pedagogical interventions

Current appointment

- **Assistant Professor, Curriculum & Instruction** 2015 - present
  University of Illinois at Urbana-Champaign
- **Affiliated faculty, National Center for Supercomputing Applications (NCSA)** 2015 - present
  University of Illinois at Urbana-Champaign
- **Affiliated faculty, Illinois Informatics Institute** 2015 - present
  University of Illinois at Urbana-Champaign

Past appointment

- **Post-Doctoral Research Associate** 2013 - 2015
  Teachers College, Columbia University - New York

Education

- **Ph. D., Computer Science**, Université de Sherbrooke 2009 - 2013
  A Model for the Generation of Hints by a Model-Tracing Tutor Authoring Framework
- **Certificate, Psychology**, Université de Sherbrooke 2008 - 2010
- **M. Sc., Computer Science**, Université de Sherbrooke 2008 - 2009
  Authoring Problem-Solving Tutors: A Comparison Between ASTUS and CTAT
- **B. Sc., Computer Science**, Université de Sherbrooke 2004 - 2007

- **DEC, Natural Science**, Collège Édouard-Montpetit 2002 - 2004

Publications

Journal papers

- **Paquette, L.**, Baker, R.S. (under review). Comparing Machine Learning to Knowledge Engineering for Modeling SRL Behaviors: A Case Study in Gaming the System. *Computers in Human Behavior, special issue*.

- Bosch, N., **Paquette, L.** (under review). Metrics for Discrete Student Models: Chance Levels, Comparisons, and Use Cases. *Journal of Learning Analytics, special issue.*

- Wang, Y., Baker, R., **Paquette, L.** (under review). Behavioral Predictors of Post-MOOC Career Development. *International Journal on E-Learning*.

- Jiang, Y., Clarke-Midura, J., Keller, B., Baker, R.S., **Paquette, L.**, Ocumpaugh, J. (under review). Note-Taking and Science Inquiry in an Open-Ended Learning Environment. *Journal of Contemporary Educational Psychology*.

- DeFalco, J.A., Rowe, J., **Paquette, L.**, Georgoulas-Sherry, V., Brawner, K., Mott, B., Baker, R., Lester, J. (2017). Detecting and Addressing Frustration in a Serious Game for Military Training. *International Journal of Artificial Intelligence in Education.*

- **Paquette, L.**, Lebeau, J.-F., Beaulieu, G., Mayers, A. (2015). Designing a Knowledge Representation Approach for the Generation of Pedagogical Interventions by MTTs. *International Journal of Artificial Intelligence in Education*.

- Wang, Y., **Paquette, L.**, Baker, R. (2014). A Longitudinal Study on Learner Career Advancement in MOOCs. *Journal of Learning Analytics*.

Book chapters

- Jiang, Y., Clarke-Midura, J., Baker, R.S., **Paquette, L.**, Keller, B., Ocumpaugh, J. (accepted). How Immersive Virtual Environments Foster Self-Regulated Learning. *Digital Technologies and Instructional Design for Personalized Learning*.

- Biswas, G., Baker, R., **Paquette, L.** (2017). Data Mining Methods for Assessing Self-Regulated Learning. *Handbook of Self-Regulation of Learning and Performance*.

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2010). Authoring Problem-Solving Tutors: A Comparison Between ASTUS and CTAT. *Advances in Intelligent Tutoring System*, 377-405.

Conference full papers in stringently refereed proceedings

- **Paquette, L.**, Bosch, N., Mercier, E., Jung, J., Shehab, S., Tong, Y. (in press). Matching Data-Driven Models of Group Interactions to Video Analysis of Collaborative Problem Solving on Tablet Computers. *Proceedings of the 13th International Conference of the Learning Sciences*.

- Jiang, Y., Bosch, N., Baker, R.S., **Paquette, L.**, Ocumpaugh, J., Andres, JAL, Moore, A., L, Biswas, G. (in press). Expert Feature-Engineering vs. Deep Neural Networks: Which is Better for Sensor-Free Affect Detection? *Proceedings of the 19th International Conference on Artificial Intelligence in Education*.

- **Paquette, L.**, Baker, R. (2017). Variations of Gaming Behaviors Across Populations of Students and Across Learning Environments. *Proceedings of the 18th International Conference on Artificial Intelligence in Education*, 274-286.

- Ocumpaugh, J., Baker, R., Defalco, J., **Paquette, L**., Andres, J.M. (2017). Affect Dynamics in Military Trainees. *Proceedings of the 18th International Conference on Artificial Intelligence in Education*, 238-249.

- Crossley, S., **Paquette, L.**, Dascalu, M., McNamara, D.S., Baker, R.S. (2016). Combining Click-Stream Data with NLP Tools to Better Understand MOOC Completion. *Proceedings of the 6th International Conference on Learning Analytics & Knowledge*, 6-14.

- Zhu, M., Bergner, Y., Zhang, Y., Baker, R., Wang, Y., **Paquette, L.** (2016). Longitudinal Engagement, Performance, and Social Connectivity: a MOOC Case Study Using Exponential Random Graph Models. *Proceedings of the 6th International Conference on Learning Analytics & Knowledge*, 223-230.

- **Paquette, L.**, Baker, R. S., de Carvalho, A., Ocumpaugh, J. (2015). Cross-System Transfer of Machine Learned and Knowledge Engineered Models of Gaming the System. *Proceedings of the 23rd Conference on User Modelling, Adaptation and Personalization*.

- **Paquette, L.**, Rowe, J., Baker, R. S., Mott, B., Lester, J., DeFalco, J., Brawner, K., Sottilare, R., Georgoulas, V. (2015). Sensor-Free or Sensor-Full: A Comparison of Data Modalities in Multi-Channel Affect Detection. *Proceedings of the 8th International Conference on Educational Data Mining*.

- Kai, S., **Paquette, L.**, Baker, R. S., Bosch, N., D'Mello, S., Ocumpaugh, J., Shute, V., Ventura, M (2015). A Comparison of Face-based and Interaction-based Affect Detectors in Physics Playground. *Proceedings of the 8th International Conference on Educational Data Mining*.

- Jiang, Y., **Paquette, L.**, Baker, R. S., Clarke-Midura, J. (2015). Comparing Novice and Experienced Students in Virtual Performance Assessments. *Proceedings of the 8th International Conference on Educational Data Mining*.

- Beaulieu, G., **Paquette, L.**, Mayers, A. (2015). Un modèle pour la gestion automatisé de buts de succès dans les tuteurs par traçage de modèle. *Proceedings of the 7th Conference on Environnement Intelligent pour l'Apprentissage Humain*.

- **Paquette, L.**, de Carvalho, A. M. J. A., Baker, R. S. (2014). Achieving a Better Understanding of how Expert Classify Students Gaming and Intelligent Tutor Through Cognitive Modeling. *Proceedings of the 36th Annual Cognitive Science Conference, 1126-1131*.

- **Paquette, L.**, Baker, R. S., Sao Pedro, M. A., Gobert, J. D., Rossi, L., Nakama, A., Kauffman-Rogoff, Z. (2014). Sensor-Free Affect Detection for a Simulation-Based Science Inquiry Learning Environment. *Proceedings of the 12th International Conference on Intelligent Tutoring Systems, 1-10*.

- Sao Pedro, M. A., Jiang, Y., **Paquette, L.**, Baker, R. S. J. d., Gobert, J. D. (2014). Identifying Transfer of Inquiry Skills Across Physical Science Simulations Using Educational Data Mining. *Proceedings of the 11th International Conference of the Learning Sciences*.

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2013). La plateforme Astus : Une alternative aux systèmes de productions pour la création de tuteur par traçage de modèle. *Proceedings of the 6th Conference on Environnement Intelligent pour l'Apprentissage Humain*.

- **Paquette, L.**, Lebeau, J.-F., Beaulieu, G., Mayers, A. (2012). Automating Next-Step Hints Generation Using ASTUS. *Proceedings of the 11th International Conference on Intelligent Tutoring Systems*, 201-211.

- Boisvert, A.-A., **Paquette, L**., Pigot, H., Giroux, S. (2009). Design Challenges for Mobile Assistive Technologies Applied to People with Cognitive Impairments. *Proceedings of the 7th International Conference on Smart Homes and Health Telematics*, 17-24.

Conference short papers and posters

- Paquette, L., Baker, R.S., Moskal, M. (in press). A System-General Model for the Detection of Gaming the System Behavior in CTAT and LearnSphere. *Proceedings of the 19th International Conference on Artificial Intelligence in Education*. (poster)

- Kai, S., Andres, J.M., **Paquette, L.**, Baker, R., Molnar, K., Watkins, H., Moore, M. (2017). Predicting Student Retention from Behavior in Online Orientation Course. *Proceedings of the 10th International Conference on Educational Data Mining*, 250-255. (short paper)

- Malkiewich, L., Baker, R.S., Shute, V., Kai, S., **Paquette, L.** (2016). Classifying Behavior to Elucidate Elegant Problem Solving in an Educational Game. *Proceedings of the 9th International Conference on Educational Data Mining*. (short paper)

- **Paquette, L.**, Ocumpaugh, J., Baker, R. (2015). Simulating Multi-Subject Momentary Time Sampling. *Proceedings of the 8th International Conference on Educational Data Mining*, 586-587. (poster)

- Crossley, S., McNamara, D., Baker, R. S., Wang, Y., **Paquette, L.**, Barnes, T., Bergner, Y. (2015). Language to Completion: Success in Educational Data Mining Massive Open Online Class. *Proceedings of the 8th International Conference on Educational Data Mining*. (short paper)

- Jiang, Y., Baker, R. S., **Paquette, L.**, San Pedro, M. O., Heffernan, N. T. (2015). Learning, Moment-by-Moment and Over the Long Term. *Proceedings of the 17th International Conference on Artificial Intelligence in Education*. (poster)

- Andres, J.M., Rodrigo, M.M.T., Sugay, J.O., Baker, R.S., **Paquette, L.**, Shute, V.J., Ventura, M., Small, M. (2014). An Exploratory Analysis of Confusion Among Students Using Newton's Playground. *Proceedings of the 22nd International Conference on Computers in Education*. (short paper)

- **Paquette, L.**, de Carvalho, A. M. J. A., Baker, R. S., Ocumpaugh, J. (2014). Reengineering the Feature Distillation Process: A Case Study in the Detection of

Gaming the System. *Proceedings of the 7th International Conference on Educational Data Mining, 284-287*. (short paper)

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2013). Diagnosing Errors from Off-Path Steps in Model-Tracing Tutors. *Proceedings of the 16th Conference on Artificial Intelligence in Education*. (poster)

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2012). Automating the Modeling of Learners' Erroneous Behaviors in Model-Tracing Tutors. *Proceedings of the 20th International Conference on User Modeling, Adaptation and Personalization*, 316-321. (short paper)

- **Paquette, L.**, Lebeau, J.-F., Mbungira, J. P., Mayers, A. (2011). Generating Task-Specific Next-Step Hints Using Domain-Independent Structures. *Proceedings of the 15th International Conference on Artificial Intelligence in Education*, 525-527. (poster)

- Lebeau, J.-F., Fortin, M., **Paquette, L.**, Mayers, A. (2009). From Cognitive to Pedagogical Knowledge Models in Problem-Solving ITS Frameworks. *Proceedings of the 14th International Conference on Artificial Intelligence in Education*, 731-733. (poster)

Edited proceedings

- Hu, X., Barnes, T., Hershkovitz, A., **Paquette, L.** (Eds.) (2017) *Proceedings of the 10th International Conference on Educational Data Mining*.

- Vigentini, L., Wang, Y., **Paquette, L.**, Urrutia, M. L. (Eds.) (2017) *MOOC Analytics: Live Dashboards, Post-Hoc Analytics and the Long-Term Effects. Joint MOOCs Workshops from the Learning Analytics and Knowledge (LAK) Conference 2017*.

Workshop and symposium papers

- Bosch, N., **Paquette, L.** (2017). Training Unsupervised Deep Neural Networks with Educational Data. *Deep Learning with Educational Data Workshop*.

- Wang, Y., Baker, R.S., **Paquette, L.** (2017). Behavioral Predictors of MOOC Post-Course Development. *Proceedings of the Workshop on Integrated Learning Analytics of MOOC Post-Course Development*.

- Andres, J.M., Rodrigo, M.M.T., Baker, R., **Paquette, L.**, Shute, V., Ventura, M. (2015). Analyzing Student Action Sequences and Affect While Playing Physics Playground. *Proceedings of the International Workshop on Affect, Meta-Affect, Data and Learning*.

- Baker, R.S., DeFalco, J.A., **Paquette, L.**, Georgoulas, V., Rowe, J., Mott, B., Lester, J. (2015). Motivational Feedback Designs for Frustration in a Simulation-based Combat Medic Training Environment. *Proceedings of the 3rd Annual GIFT Users Symposium*, 81-88.

- Sao Pedro, M.A., Moussavi, R., Gobert, J.D., Toto, E., **Paquette, L.** (2015). Automatic Assessment of Students' Data Analysis Skills Across Physical Science Simulations. Paper to be presented as part of a symposium Bejar, I.I, *The State of the Art in Automated Scoring of Science Inquiry Tasks* at the *American Education Research Association*, Chicago, IL.

- Baker, R. S., DeFalco, J.A., Ocumpaugh, J., **Paquette, L.** (2014). Towards Detection of Engagement and Affect in a Simulation-Based Combat Medic Training Environment. Paper presented at *2nd Annual GIFT User Symposium (GIFTSym2)*.

Young research track papers

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2010). Integrating Sophisticated Domain-Independent Pedagogical Behaviors in an ITS Framework. *Proceedings of the 10th International Conference on Intelligent Tutoring Systems (part II)*, 248-250.

- Lebeau, J.-F., **Paquette, L.**, Fortin, M., Mayers, A. (2010). An Authoring Language as a Key to Usability in a Problem-Solving ITS Framework. *Proceedings of the 10th International Conference on Intelligent Tutoring Systems (part II)*, 236-238.

Interactive events

- **Paquette, L.**, Lebeau, J.-F., Mayers, A. (2013). Authoring Problem-Solving ITS with ASTUS. *Proceedings of the 16th International Conference on Artificial Intelligence in Education*.

- Lebeau, J.F., **Paquette, L.**, Mayers, A. (2011). Authoring Problem-Solving ITS with ASTUS. *Proceedings of the 15th International Conference on Artificial Intelligence in Education*, 622.

- Lebeau, J.-F., **Paquette, L.**, Mayers, M. (2010). Authoring Problem-Solving ITS with ASTUS. *Proceedings of the 10th International Conference on Intelligent Tutoring Systems (part II)*, 450.

Other participations at conferences

- **Paquette, L.** (2014). Learning@scale Challenges for Educational Data Miners. Invited panel presentation during the ITS and Learning@scale panel. *12th International Conference on Intelligent Tutoring System 2014*.

Invited seminar talks

- Combining Cognitive Modeling and Machine Learning to Better Understand and Produce Better Models of Students "Gaming" Intelligent Tutors. *Institute for Creative Technologies*. *University of Southern California*. June 3rd, 2014.

- Réingénierie du processus de création des attributs : une étude de cas pour la détection des étudiants qui "exploitent le logiciel". *Computer Science Department*. *Université de Sherbrooke*. March 31st 2014.

Grants

- **National Science Foundation, EHR Core Research**. Collaborative Research: Using Data Mining and Observation to Derive an Enhanced Theory of SRL in Science Learning Environments. Gautam Biswas (PI), Ryan Baker (PI), **Luc Paquette (Co-PI)**, $1,492,122 (across 3 2016 – 2019

institutions). Award #DRL-1561567.

- **National Science Foundation, Cyberlearning**. DIP: Improving Collaborative Learning in Engineering Classes Through Integrated Tools. Emma Mercier (PI), **Luc Paquette (Co-PI)**, $1,349,576. Award #DRL-1628976 — 2016 – 2020

Fellowships, scholarships and awards

- Best Student Paper Award (as co-author with Shimin Kai), 8th International Conference on Educational Data Mining — 2015
- FRQNT post doctoral fellowship (40,000$) — 2013 - 2014
- NSERC post graduate scholarship (CGS D, 3 years, 105,000$) — 2010 - 2013
- NSERC post graduate scholarship (CGS M, 1 year, 17,500$) — 2009 - 2010
- Institutional scholarship (Université de Sherbrooke, 1,800$) — 2008
- Ubisoft scholarship (Université de Sherbrooke, 1,500$) — 2008
- Fernand Seguin medal (Université de Sherbrooke, school of science) — 2007
- J.-Armand Bombardier scholarship (Université de Sherbrooke, 1,000$) — 2005
- Admission scholarship (Université de Sherbrooke, 1,000$) — 2004

Past professional experience

- **Educational Data Mining Consultant** — 2014
  TERC - Technical Education Research Centers
  Institute of Play, Pearson

- **Head Community Teaching Assistant** — 2013
  Teachers College, Columbia University - New York
  Big Data in Education, Coursera

- **Teaching Assistant** — 2010 - 2012
  Université de Sherbrooke - Sherbrooke

- **C# / C++ Generalist Programmer** — 2006 - 2007
  Ubisoft Montréal - Montréal

- **Java J2ME Programmer** — 2005
  Humagade Inc. - Pont-Rouge

Service

- College of Education Representative on the **Council for Learning Outcomes Assessment** – University of Illinois at Urbana-Champaign — 2017-2018

- Representative for the department of Curriculum & Instruction on the **Faculty Senate** – University of Illinois at Urbana-Champaign 2017-2018
- Member of the O'Leary Learning Center Design Committee – College of Education 2015-2018
- Member of the **Faculty Advisory Committee (FAC)** – Department of Curriculum & Instructions 2017-2018
- Organizer for the **Computer Assisted Language Learning (CALL) Seminar Series** – University of Illinois at Urbana-Champaign 2016-2017
- Member of the **Faculty and Staff Awards Committee** – Department of Curriculum & Instructions 2016-2017
- Member of the **Science Education Faculty Search Committee** – Department of Curriculum & Instructions 2016-2017
- **Program Chair** for the 10th International Conference on Educational Data Mining (EDM 2017) 2016-2017
- **Reviewer** for international conferences:
    - The International Conference on Artificial Intelligence in Education (AIED; 2015, 2017)
    - The International Conference on Educational Data Mining (EDM; 2016)
    - The International Conference on Intelligent Tutoring Systems (ITS; 2016)
    - The Annual Meeting of the Intelligent User Interface Community (IUI; 2016, 2017)
    - The International Workshop on Empathic Computing (IWEC; 2014)
    - The International Conference on Learning Analytics and Knowledge (LAK; 2016, 2017, 2018);
    - Learning with MOOCs (LWMOOCS; 2016, 2017).
- **Reviewer** for international journals:
    - International Journal of Artificial Intelligence in Education (IJAIED)
    - International Journal of Educational Data Mining (JEDM)
    - Journal of Learning Analytics (JLA)
    - Computers and Education
    - IEEE Transactions on Affective Computing
    - IEEE Transactions on Learning Technology
    - Technology, Knowledge and Learning (TKNL)
    - British Journal of Educational Technology (BJET)
    - International Journal of Information Technology & Decision Making (IJITDM)
    - Interacting with Computers (IWC)
    - Canadian Journal of Learning and Technology (CJLT)
- **Reviewer** for the 2017 NCSA research fellow program 2016

Teaching

CI 210: Introduction to Digital Learning Environments
- Fall 2017

CI 438: Computer Programming and the Classroom
- Spring 2017

CI 489: DELTA Capstone Project
- Spring 2018

CI 507: Introduction to Educational Data Mining
- Spring 2016, Fall 2017

CI 550: Methods of Educational Inquiry
- Spring 2017

CI 590: DELTA Graduate Seminar
- Spring 2018