

# DANIEL J. REA

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## PROJECT HIGHLIGHTS



### MOVERS AND SHAKERS

Draw attention to targets in a robot's video feed without being distracting.

Leveraged literature in perception, psychology, and computer vision to iteratively design more than seven visual cues; explored the tradeoffs of each in terms of targets found, response time, and user cognitive load.

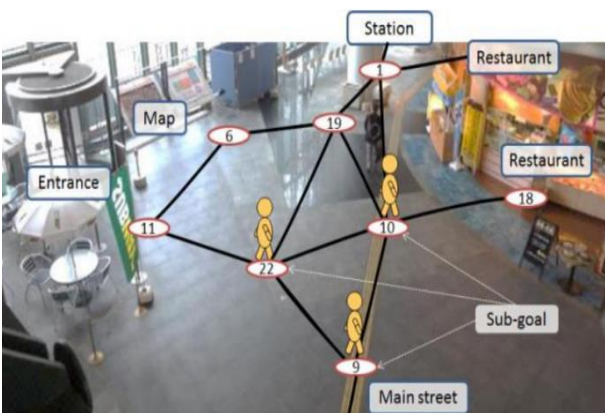
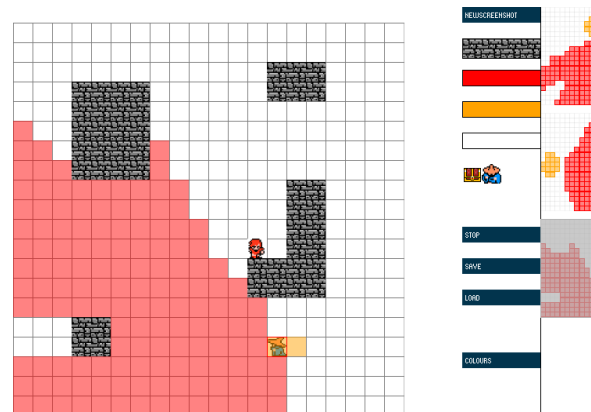
user experience, interaction design, Human-robot interaction, multi-robot teleoperation, attention

### PAINTBOARD (MSC. RESEARCH)

Paint and storyboard prototype NPC AI in minutes.

Other design elements include representation and mining of the storyboard data, use of multiple machine learning algorithms, and use of concurrency for usability.

user experience, interaction design, end-user programming, machine learning, interactive graphics, technical writing, user studies, game design



### MODELLING AND PREDICTION OF PEDESTRIAN BEHAVIOUR

Predicted how people walk through complex environments by modelling their mid-term goals on the way to their destination. EM Modelling by analyzing millions of data entries from days of real-time data

data mining, simulation, expectation-maximization algorithm design, ubiquitous computing

## EDUCATION

- 2015 – Present Ph.D., Computer Science, The University of Manitoba, GPA 4.5/4.5 (est. grad. Summer 2019)
- 2012 – 2014 M.Sc., Computer Science, The University of Manitoba, GPA 4.4/4.5 (grad: Jan. 2015)
- 2006 – 2012 BCs., Computer Science, Honours Co-Op Program, The University of Manitoba, GPA 4.3/4.5
- 2006 High School Diploma, Sisler High School, graduating average 96.7%

## AWARDS

- 2015 – 2019 Gordon Wu Scholarship, \$5 000/year for 3 years, \$40 000 in the 4<sup>th</sup> year (institutional, academic)
- 2015 – 2018 NSERC Postgraduate Scholarship (CGS-D), \$35 000/year, (national, academic)
- 2015 – 2019 Guaranteed Funding Package, \$20 000/year (departmental, academic)
- 2015 Faculty of Graduate Studies Travel Grant, \$1 000 (institutional, academic)
- 2015 Faculty of Science Travel Grant, \$700 (institutional, academic)
- 2014 Faculty of Graduate Studies Travel Grant, \$1 000 (institutional, academic)
- 2014 Faculty of Science Travel Grant, \$700 (institutional, academic)
- 2014 ACM SIGCHI HAI Conference Volunteer Travel Grant, \$450 (international, academic)
- 2014 Graduate Student Association Travel Grant, \$720 (institutional, academic)
- 2013 Japan Society for the Promotion of Science Summer Program, \$5 500 (national, academic)
- 2013 NSERC Michael Smith Foreign Studies Supplement (MS-FSS), \$6 000 (national, academic)
- 2006 – 2012 Dean's Honour List
- 2012 NSERC Postgraduate Scholarship (CGS-M), \$17 500 (national, academic)
- 2012 University of Manitoba Tricouncil Master's Supplement Award, \$21 000 (institutional, academic)
- 2012 Faculty of Science Travel Grant, \$500 (departmental, academic)
- 2012 University of Manitoba Student Union Travel Grant, \$500 (institutional, academic)
- 2011 Japanese Language Proficiency Test (JLPT) Level 2 / 日本語能力試験 N2
- 2007 – 2008 UMSU Undergraduate Scholarship for high academic standing. \$1 000. (institutional, academic)
- 2007 MTS Mobility Scholarship \$1000 (department, academic)
- 2007 Stanley R. Scarr Scholarship \$600 (city, academic)
- 2006 Chown Centennial Scholarship, \$500 (top graduating student)
- 2006 Queen Elizabeth II Entrance Scholarship, \$2000 (a graduating average of 95% or higher)

## PUBLICATIONS

Daniel J. Rea, Stela H. Seo, Neil Bruce, James E. Young. "Movers, Shakers, and Those Who Stand Still: Visual attention-grabbing techniques in robot tele-operation." *Human-Robot Interaction*. ACM. 2017 (to appear).

Roberta Cabral Ramos Mota, DANIEL J. REA, Anna Le Tran, James E. Young, Ehud Sharlin, Mario Costa Sousa. "Playing the 'Trust Game' with Robots: Social Strategies and Experiences." In *proc. Robot and Human Interactive Communication (RO-MAN)*, IEEE. 2016.

Nico Li, DANIEL J. REA, James E. Young, Ehud Sharlin, Mario Costa Sousa. "And He Built a Crooked Camera: A Mobile Visualization Tool to View Four-dimensional Geometric Objects." *SIGGRAPH Asia*, ACM. 2015.

DANIEL J. REA, Yan Wang, James E. Young. "Check Your Stereotypes at the Door: An Analysis of Gender Typecasts in Social Human-Robot Interaction." In proc. Intl. Conf. on Social Robotics (ICSR), Springer. 2015

Johann Wentzel, DANIEL J. REA, James E. Young, Ehud Sharlin. "Shared Presence and Collaboration Using a Co-Located Humanoid Robot." In adjunct proc. Human-Agent Interaction. ACM. 2015.

Amy Banh, DANIEL J. REA, James E. Young, Ehud Sharlin. "Inspector Baxter: The Social Aspects of Integrating a Robot As a Quality Inspector in an Assembly Line." In proc. Human-Agent Interaction, ACM. 2015.

DANIEL J. REA, Takeo Igarashi, James E. Young. "PaintBoard – Prototyping Interactive Character Behaviors by Digitally Painting Storyboards." In proc. Human-Agent Interaction, ACM. 2014. Best Paper Award.

Barrett Ens, DANIEL REA, Roiy Shpaner, Hadi Hemmati, James E. Young, Pourang Irani. "ChronoTigger: A Visual Analytics Tool for Understanding Source and Test Co-Evolution." In proc. VISSOFT '14, IEEE. 2014.

DANIEL J. REA, Takeo Igarashi, James E. Young. "Behavior Primitives for End-User NPC Behavior Creation." In adjunct proc. Human-Agent Interaction, 2013. Best Poster Runner-up.

Tetsushi Ikeda, Yoshihiro Chigodo, DANIEL REA, Francesco Zanlungo, Masahiro Shiomi, Takayuki Kanda. "Modeling and Prediction of Pedestrian Behavior based on the Sub-goal Concept." RSS, 2012.

DANIEL J. REA, James E. Young, and Pourang Irani. "The Roomba Mood Ring: an Ambient-Display Robot." Adjunct Proceedings, Human-Robot Interaction, 2012.

Mathieu Couture, Frédéric Massicotte and DANIEL REA, "Last Minute Traffic Forwarding for Malware analysis in a Honeynet." Communications Research Center Technical Note CRC-TN-2010-001, June 2010.

## INVITED TALKS

- |      |   |
|------|---|
| 2015 | Papers We Love, SkullSpace Winnipeg – PaintBoard – Prototyping Interactive Character Behaviours by Digitally Painting Storyboards |
| 2014 | University of Calgary – PaintBoard – Prototyping Interactive Character Behaviours by Digitally Painting Storyboards               |

## RELEVANT EXPERIENCE

### **University of Manitoba**

May '11 — Present

*Research Associate, Winnipeg, Manitoba*

Ph.D. student under Dr. James E. Young (from September 2015) research how modern video game interface techniques can improve robotic teleoperation.

Masters of Science student under Dr. James E. Young (from September 2012) researching new interfaces and techniques to speed up the prototyping of Non-player characters' interactive behaviours in video games.

Partnered with industry to prototype and develop an interface for remote inspection with a robotic camera.

Carried out my undergraduate honours project with Dr. James E. Young. I planned and implemented a research project about Human-Robot Interaction. Designed and carried out a study and evaluation.

Reviewed for International Conferences: TEI 2013-2014, 2016, ACE2013-2016, IUI 2014, 3D-UI 2015, CHI 2015, GI 2015, RO-MAN 2015-16. HRI2016-17 RAS. HAI2014-16, GI 2015-16

Program Committee Member: ACE 2015-16

Organizing Committee Member: HAI 2014-16, HRI 2016

*Teaching Assistant: Human-Computer Interaction (COMP 3020)*

September '16 — December '16

*Teaching Assistant: Introduction to Computer Programming (COMP 1010)* September '11 — December '12

**University of Calgary**

Sept '14 — December '14

*Visiting Researcher, Calgary, Alberta*

Research focusing on interaction with humanoid industrial robots.

Developing design guidelines for immersive environments possible with devices like the Oculus Rift.

**University of Tokyo – Igarashi Lab (JST ERATO)**

January '13 — August '13

*Visiting Researcher, Tokyo, Japan*

Researching user-focused interfaces for artist creation of interactive behaviours for autonomous agents.

Created, presented and marked the term project for a 4<sup>th</sup> year Human-Computer Interaction course.

**Advanced Telecommunications Institute International (ATR)**

May '10 — May '11

*Research Intern, Kyoto, Japan*

Developed and published a new algorithm for predicting pedestrian motion in complex environments.

Researched and studied unsupervised learning algorithms, pedestrian modeling, and research methodologies.

**Communications Research Centre**

September '09 — December '09

*Network Researcher, Ottawa, ON, Co-op Work Term*

Developed research tools, ran experiments, and was exposed to research methodologies.

Created programs that dynamically adjusted routing tables to trick malware into revealing how they work.

**Public Health Agency of Canada (CNPHI Team)**

January '09 — April '09

*Software Developer, Winnipeg, MB, Co-op Work Term*

Developed competent SQL skills, worked with a large existing codebase (tens of thousands of lines of code), and saw projects through from design to deployment, and then maintenance.

Created a statistics generating program that graphed information generically from dozens of applications.

Included J2ee, JSP, IBM Rational development software, and cross-browser compatibility techniques.

## SKILLS

### Programming:

Java (8 years, Eclipse), Python (2 years, Web2Py, OpenCV, NumPy)

C++ (game programming), C# (Unity3D, Windows Store App), C

Sockets (TCP/UDP), distributed systems, the network stack, Ethereal/Wireshark, Linux network tools

Javascript, JQuery, CSS, HTML, AJAX

Databases, SQL

LC-3 Assembly

Matlab / Octave for Digital Image Processing

### Operating Systems:

Comfortable in Windows, OSX, Linux, Linux/ROS

### Hardware:

embedded systems (Arduino, AVR boards), basic soldering

## VOLUNTEER EXPERIENCE

*Web Chair for the 11<sup>th</sup> ACM Conference on Human-Robot Interaction (HRI)*

Sept '15 — Mar. '16

HRI is the original and most competitive conference focusing on Human-Robot Interaction. I was recruited to manage the conference app and website, collaborating with many of the top researchers in my field.

*Web Chair for the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> ACM Conference on Human-Agent Interaction (HAI)*

Sept '13 — Oct. '16

HAI is a new conference that tries to unify the research that has been done in Human-Computer Interaction, Human-Robot Interaction, Psychology, and Sociology.

Chief duties include creation and maintenance of the HAI website; I am designing the website to get authors and sponsors the necessary information in a quick and clean way, as well as promote the conference on the internet. I also help shape the vision and future of the conference.

*Vice President Competitions of the International Computer Science Games 2012*

Sept '11 — Sept '12

The CS Games is an annual international competition for university students in Computer Science and Engineering to compete in academic and social challenges.

Responsible for the team that created the challenges. Recruited, ran meetings, brainstormed, proofread questions, checked solutions, and kept things running smoothly during the event itself.

## INTERESTS

Video Game Development: Developing a 3D Space/Business Real Time Strategy game in Unity3D.

Japanese Language and Culture: Fluent in conversational Japanese. I play Shogi and Go, and I love Kyudo.

Music: I play clarinet and baritone sax. Self-taught basic piano and bass. I sing bass, and swing dance.