

## Michael Slugocki

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CONTACT INFORMATION	179 George Street Unit 503 Hamilton, ON L8P 1E6 www.slugocm.ca	905-921-7702 slugocm@mcmaster.ca
RESEARCH INTERESTS	Machine vision, Visual Psychophysics, Computer vision, Bayesian inference, Predictive modeling	
EDUCATION	<b>Vision Researcher - McMaster University</b> , Hamilton, ON	
	Ph.D. Candidate, Psychology, Neuroscience & Behaviour	<i>Expected:</i> Winter 2017
	<ul style="list-style-type: none"><li>• Advisors: Dr. Allison B. Sekuler - VP Research, Baycrest Health Sciences Dr. Patrick J. Bennett - Professor, McMaster University</li><li>• Relevant Coursework: <i>Statistics and research design, Computational models and machine learning, Signal detection theory, Psychometrics</i></li></ul>	
	B.Sc.(Hons), Psychology, Neuroscience & Behaviour	Apr 2008
	<ul style="list-style-type: none"><li>• Advisors: Dr. Terri L. Lewis and Dr. Daphne M. Maurer</li></ul>	
CERTIFICATIONS	Microsoft Technology Associate: Database Fundamentals	Certified 2017
	<ul style="list-style-type: none"><li>• Knowledge of and skills with relational databases, with emphasis on Microsoft SQL Server.</li></ul>	
DISTINGUISHED PROJECTS	Automated detection system for oral diseases	2017–present
	In collaboration with Faculty of Dentistry, University of Toronto	
	<ul style="list-style-type: none"><li>• Developing automated system to assist dental radiologists in detecting oral diseases from radiographs using neural networks programmed in Python with use of Tensorflow.</li><li>• Additional processing of images performed using OpenCV.</li></ul>	
	Object perception with Microsoft HoloLens	2017–present
	<ul style="list-style-type: none"><li>• Examining human perception of geometric features of objects using holographic stimuli designed in Unity game creation software and deployed with Microsoft HoloLens.</li></ul>	
RESEARCH EXPERIENCE	Researcher, Department of PNB, McMaster University	2013–present
	<ul style="list-style-type: none"><li>• Thesis examines what features neural populations use to encode shape, and how these representations can be applied to improving object detection algorithms.</li><li>• Developed probabilistic computational model in Python and C++ of how human visual cortex can generate representations of shape.</li><li>• Used several machine learning algorithms (e.g., CNNs, MLPs, etc.) to evaluate the ability of non-linear systems in using different shape representations for object classification performance</li><li>• Developed psychometric curve fitting algorithms in Python and R to model human performance on visual tasks.</li><li>• Developed and managed research design and methods used to collect data</li><li>• Applied advanced hierarchical regression models to data to drive novel research directions.</li><li>• Programmed Eyelink 1000 eye-tracker to measure pupil dilation and eye-movements while human observers performed vision based tasks.</li><li>• Communicated findings through formal peer-reviewed reports generated in LaTeX, Jupyter Notebook, and RMarkdown.</li></ul>	

- Generated publication quality figures in Python and R to illustrate findings.
- Trained and mentored undergraduate thesis students on data collection and analysis.

TEACHING EXPERIENCE	Teaching Assistant, Department of PNB, McMaster University	2013–present
	<ul style="list-style-type: none"> <li>• Coordinate instructional efforts to help students conceptualize course materials.</li> <li>• Prepare and lead lectures, tutorials, review sessions, and small group discussions of relevant topics.</li> <li>• Provide constructive written and oral feedback on student assessments, such as formal reports and in-class presentations; grading of student work.</li> <li>• Responsible for invigilating course examinations and enforcing administrative policies as needed.</li> </ul>	
	Undergraduate thesis supervisor (3QQ3/4D09) Department of PNB, McMaster University	2013–2016
	<ul style="list-style-type: none"> <li>• Helped students with: research design, data collection, statistical analysis, and providing feedback on written reports.</li> </ul>	
TECHNICAL SKILLS	Software <ul style="list-style-type: none"> <li>• Programming languages: Python, R, C#, C++, Matlab, Java, HTML, Julia</li> <li>• Deep-learning libraries: Tensorflow, Keras</li> <li>• Cloud computing: P4000, P5000, P6000</li> <li>• Database management: SQL, MongoDB</li> <li>• Game development: Unity</li> <li>• Document generation: LaTeX, Jupyter Notebook, RMarkdown, Sweave</li> <li>• Version control: GIT</li> <li>• Web based: Jekyll, Wordpress</li> <li>• Other: GNU Make, Adobe Photoshop, MS Office Suite</li> </ul> Hardware/Apparatuses <ul style="list-style-type: none"> <li>• Microsoft HoloLens</li> <li>• Mirror stereoscope</li> <li>• EyeLink 1000 Eye-tracker</li> <li>• Microcontrollers: Arduino Uno, Arduino Mega 2560</li> <li>• Shutter glasses with IR transmitter (VPixx Technologies)</li> <li>• Pupillary distance meter (PDM Digital PD Meter)</li> <li>• Photometer (SpectraScan PhotoResearch 650)</li> </ul> Statistics and Machine Learning <ul style="list-style-type: none"> <li>• Regression: Linear and Non-Linear, Lasso, Ridge, Stepwise, Loess</li> <li>• Bayesian inference: Hierarchical Bayesian models, Monte Carlo</li> <li>• Deep Learning: Convolutional Neural Networks (CNNs), Multi-layer Perceptrons (MLPS), Recurrent Neural-Networks (RNNs)</li> <li>• Machine learning: K-means, Naive Bayes, Decision trees and Random forests</li> <li>• Dimensionality Reduction: Principal component analysis, Factor analysis</li> </ul>	
PUBLICATIONS	1. <b>Slugocki, M.</b> , Sekuler, A.B., & Bennett, P.J. (submitted, 2017) BayesFit: A tool for modeling psychophysical data using Bayesian inference. <i>Journal of Open Research Software</i>	
PENDING PUBLICATIONS	1. <b>Slugocki, M.</b> , Duong, C.Q., Sekuler, A.B., & Bennett, P.J. (pending submission, early 2018) Evaluating temporal interactions between pairs of shapes.	

	<ol style="list-style-type: none"> <li>2. <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (pending submission, early 2018) Evaluating phase dependent masking with Radial Frequency contours.</li> <li>3. <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (pending submission, early 2018) Local perturbations to a global Radial Frequency masker alleviate lateral masking effects.</li> <li>4. <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (pending submission, early 2018) Uniform sensitivity to curvature deformations across polar angle.</li> </ol>
PRE-PUBLICATIONS	<ol style="list-style-type: none"> <li>1. <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (2017). BayesFit: A tool for modeling psychophysical data using Bayesian inference. DOI: <a href="https://psyarxiv.com/fnp28/">https://psyarxiv.com/fnp28/</a></li> </ol>
CONFERENCE PROCEEDINGS	<ol style="list-style-type: none"> <li>1. <b>Slugocki, M.</b>, Duong, C., Sekuler, A.B., &amp; Bennett, P.J. (2016). Evaluating Temporal Interactions Between Pairs of Shapes. <i>Journal of Vision</i>, 16(12), 796-796.</li> <li>2. <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (2015). Evaluating Phase Dependent Masking with Radial Frequency Contours. <i>Journal of Vision</i>, 15(12), 1026-1026.</li> <li>3. Beers, A., <b>Slugocki, M.</b>, Sekuler, A.B., &amp; Bennett, P.J. (2015). Evaluating Phase Dependent Masking with Radial Frequency Contours. <i>Journal of Vision</i>, 15(12), 1026-1026.</li> <li>4. <b>Slugocki, M.</b>, Sekuler, A., &amp; Bennett, P. (2014). Local Perturbations to a Global Radial Frequency Masker Alleviate Lateral Masking Effects. <i>Journal of Vision</i>, 14(10), 243-243.</li> <li>5. <b>Slugocki, M.</b>, Maurer, M., Peterson, M.A., &amp; Lewis, T.L. (2013). The effect of convexity in biasing childrens perception of figures., <i>Child Vision Research Society</i></li> <li>6. <b>Slugocki, M.</b>, Maurer, M., Peterson, M.A., &amp; Lewis, T.L. (2013). Convexity as a cue to figure-ground segmentation in childre. <i>Journal of Vision</i>, 13(9), 718-718.</li> </ol>
AWARDS/ SCHOLARSHIPS	<p>Travel Awards</p> <ul style="list-style-type: none"> <li>• PNB Departmental travel award May 2013–2016</li> </ul> <p>Scholarships — McMaster University, PNB</p> <ul style="list-style-type: none"> <li>• McMaster Senate Scholarship Sept 2012</li> <li>• Norampac Inc. Undergraduate Scholarship Sept 2008–2012</li> <li>• McMaster Undergraduate Scholarship Sept 2008–2011</li> </ul>
ADDITIONAL ACTIVITIES	<p>Reviewer,</p> <p>The Journal of Open Research Software (JORS) 2017–present</p> <ul style="list-style-type: none"> <li>• Peer-review articles to ensure that content and software provided adhere to the quality standards of the Journal of Open Research Software (JORS).</li> </ul> <p>Colloquium Committee Member,</p> <p>Department of PNB, McMaster University 2017–present</p> <ul style="list-style-type: none"> <li>• Responsible for scheduling speakers, their accommodations, and relevant dealings in giving a colloquium talk to the Department of PNB at McMaster University about current research in their field of study.</li> </ul>

Undergraduate Thesis Poster Judge, 2013–2016  
Department of PNB, McMaster University

- Assessed undergraduate posters presentations for student theses based on the quality of their research and ability to answer relevant questions about their projects.

Undergraduate Tutor, 2013–present

- Assisted undergraduate students in understanding lecture materials from courses ranging from statistics and research design to sheep-brain neuroanatomy.

#### REFERENCES

Dr. Allison B. Sekuler  
Vice-President Research  
Baycrest Health Sciences  
University of Toronto

Dr. Patrick J. Bennett  
Professor  
Psychology, Neuroscience & Behaviour  
McMaster University

Donna Waxman  
Lab Coordinator  
Psychology, Neuroscience & Behaviour  
McMaster University