ARiEAL
Annual Report 2017

Centre for
Advanced Research
in Experimental & Applied Linguistics

PARTNERS

ARiEAL is grateful to our partners for their financial and resource support.

McMaster University HUMANITIES

Office of Vice-President Research | McMaster University

MELD

HUMANITIES Linguistics & Languages | McMaster University

School of Rehabilitation Science REACHING FURTHER

McMaster School of BIOMEDICAL ENGINEERING

McMaster University Industry Liaison Office

Front page: Photo by Colin Czerneda.

MESSAGE FROM THE DIRECTOR

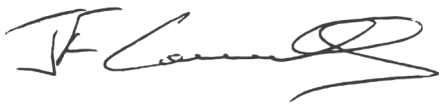
Photo by Richard Mah.

Hello and welcome to the Centre for Advanced Research in Experimental and Applied Linguistics (ARiEAL). 2017 was a remarkable year for ARiEAL. It marked the first full calendar year since our inception in late 2016.

Also, 2017 saw us move into our permanent location at the new L.R. Wilson Hall (LRW) on McMaster University campus. In this inaugural annual report, you will not only see the achievements of individual members but also the emerging pattern of collaboration among our researchers and their own national and international networks.

The Centre's membership currently includes faculty members from McMaster University and Western University with representation from faculties of Engineering, Health Sciences, Humanities, Social Sciences, and Science. This breadth of membership reflects the interdisciplinarity of the members' research – one of the primary characteristics of the Centre and its objective in providing a supportive environment for research that crosses traditional boundaries.

Also, ARiEAL views knowledge translation as a critically important part of its mission. Our efforts here are evident in the workshops presented by our invited speakers and lecture series that we have co-hosted with the Department of Linguistics and Languages (see IMPACT Section of this annual report). This 2017 annual report marks our first milestone and we look forward to sharing many more with you in the coming years.



DR. JOHN CONNOLLY

Director, ARiEAL Research Centre
Professor, Department of Linguistics and Languages
Senator William McMaster Chair in the Cognitive Neuroscience of Language

RESEARCH HIGHLIGHTS

ARiEAL brings together a diverse yet cohesive collection of researchers with expertise in linguistics and languages, relevant clinical conditions, and key neurophysiological, neuroimaging, and behavioural measures in order to advance understanding of the neural, behavioural and social foundations of human communication. Highlighted below are the 2017 research activities from each laboratory led by ARiEAL researchers.

LANGUAGE, MEMORY AND BRAIN LAB

CO-DIRECTORS: DRS. JOHN CONNOLLY & ELISABET SERVICE

Co-director of the *Language, Memory and Brain Lab*, Dr. Elisabet Service

Photo by Colin Czerneda.

The Language, Memory and Brain (LMB) Lab, co-directed by Drs. John Connolly & Elisabet Service, conducts research using brain recording/imaging and behavioural measures to investigate a range of topics including basic research on language learning, spoken word processing, and working memory and related cognitive processes. Much of this work is then applied in investigations of problem reading including dyslexia as well as studies of brain injury and disorders of consciousness. Dr. Connolly focuses primarily on the neuroscience of cognition with applications to assessment of clinical populations, while Dr. Service's research focuses on cognitive aspects of processing, acquisition and impairments of language. In 2017, two students, Michael Greencorn and Fareeha Rana, from the LMB Lab successfully completed their master's degrees, and Anni Nora (co-supervised by Dr. Riitta Salmelin of Aalto University, Finland, and Dr. E. Service) as well as Narges Armanfard (supervised by Dr. James Reilly in collaboration with Dr. J. Connolly) completed their doctoral degrees. The LMB Lab's collaboration with Dr. Noseworthy's Imaging Research Centre and the Hamilton Spectator on concussion research with retired CFL players received media attention in 2017 with its findings of long-term brain changes linked to concussion. A four-part series on this study was then featured in Hamilton Spectator and the Toronto Star in September. This soon went viral and led to a range of interviews and coverage in a variety of news outlets. The coma project continues successfully and a Collaborative Health Research Projects (CHRP) grant application was made to support expansion of this work (funded in 2018). 2017 also saw the conclusion of a CIHR-funded project on child and youth concussion involving Drs. Connolly and Noseworthy and Prof. DeMatteo. Publications on the concussion research and disorders of consciousness that also involved other ARiEAL members appeared in PLoS ONE and Consciousness and Cognition in 2017 with other related papers accepted in IEEE Journal of Biomedical and Health Informatics, and Clinical Neurophysiology. Moreover, Dr. Service received an interdisciplinary ARB grant with collaborator Dr. Catherine Connelly of the DeGroote School of Business, to study the effects of second language use on performance of work-like tasks. Dr. Service also continues as collaborator on a grant from the Academy of Finland (2016–2019) to study developmental language disorder in monolingual and bilingual children.

Co-director of the Language, Memory and Brain Lab, Dr. John Connolly and his doctoral student, Gaisha Oralova. Photo by JD Howell.

MELD PROGRAM & THE MELD BILINGUALISM LAB

DIRECTOR: DR. ANNA MORO

The McMaster English Language Development Diploma (MELD) program and the Bilingualism Lab are both directed by Dr. Anna Moro. MELD is intended for international students whose primary language is not English, but who wish to improve their English proficiency to succeed in an English-speaking higher education environment. The Bilingualism Lab investigates the underlying linguistic mechanisms of bilingual phenomena and focuses on second language acquisition. While MELD is not a research laboratory per se, interesting research on foreign language acquisition is being conducted on a regular basis with the support and guidance of the Bilingualism Lab. During September-October 2017, the MELD program began its testing schedule for the 2017-2018 cohort of students. At this time point 90 MELD students took part in an eye-tracking experiment in which participants silently read passages of varying complexity for comprehension as eye-movements were recorded. In addition, the MELD research team administered a battery of tests in which key component skills of reading (phonological processing, expressive and receptive vocabulary knowledge, reading comprehension) were measured. This testing procedure was administered to the same participants in March-April 2018 with the aim of tracking improvements of reading in English.

Director of MELD programs and the Bilingualism Lab, Dr. Anna Moro

Photo by Colin Czerneda.

TEACHING AND LEARNING LAB

DIRECTOR: DR. CATHERINE ANDERSON

Director of the *Teaching and Learning Lab,* Dr. Catherine Anderson

Photo by Colin Czerneda.

Dr. Catherine Anderson, a Teaching Professor in the Department of Linguistics and Languages, directs the Teaching & Learning Lab. The lab's research, all of which is conducted in collaboration with undergraduate student partners, focuses on students' experiences in a variety of undergraduate learning contexts. In 2017, student partners conducted research on Team-Based Learning and the Active Learning Classroom; students' use of Open Educational Resources; and on accessibility in blended learning environments. The lab also participated in data-gathering and analysis for the cyclical review of the undergraduate programs in the department.

LANGUAGE, READING AND COGNITIVE NEUROSCIENCE LAB

DIRECTOR: DR. MARC JOANISSE

The Language, Reading and Cognitive Neuroscience Lab is directed by Dr. Marc Joanisse, and is housed at The University of Western Ontario's Brain and Mind Institute. Dr. Joanisse's Lab examines the cognitive and neural foundations of language and reading across the lifespan. This includes studying reading and language disorders in children, as well as language learning and processing in adults. A wide variety of experimental techniques including eye-tracking and event-related potentials measured with EEG are used, along with resting-state and task-based functional magnetic resonance imaging. In 2017, the lab focused on studying second language processing, with an emphasis on using neuroimaging to identify how age of acquiring a second language influences the neural markers of multilingualism. The lab is also undertaking a multi-year project in which they are examining the influence of reading remediation on brain markers of reading impairment in school-age children.

Director of the *Language, Reading and Cognitive Neuroscience Lab,* Dr. Marc Joanisse

THE SYNTAX LAB

DIRECTOR: DR. IVONA KUČEROVÁ.

The Syntax Lab is directed by Dr. Ivona Kučerová and it investigates syntactic structures, i.e., combinatorial properties, of natural languages from the general-cognition perspective. Both traditional fieldwork and experimental methods are used to collect data from cross-linguistically diverse languages, including indigenous languages of Canada, in order to identify and model universal and language-specific structural properties human languages have. The primary focus of the work currently done in the lab is on grammatical expressions of animacy. In 2017, the Syntax Lab was engaged in fieldwork on Mohawk (with Dr. Ryan DeCaire, University of Toronto and Dr. Alana Johns, University of Toronto) and Inuktitut (with Dr. Alana Johns). In addition, the research assistants collected a series of animacy data from a number of typologically unrelated languages (Tagalog, Libyan Arabic, Portuguese etc.). The data has been analyzed and has become a part of a database (to be made publicly available). The lab has participated in several experimental projects on sentential processing (with Dr. Diogo Almeida, NYU Abu Dhabi; Dr. Jon Sprouse, University of Connecticut; and Dr. Jan Chromy, Charles University). Finally, the lab has started a groundwork on creating a formal research collaboration with the communities of the Six Nations of the Grand River.

Director of *The Syntax Lab*, Dr. Ivona Kučerová

Photo by Colin Czerneda.

THE READING LAB

DIRECTOR: DR. VICTOR KUPERMAN

Director of *The Reading Lab*, Dr. Victor Kuperman

Photo by JD Howell.

The Reading Lab is directed by Dr. Victor Kuperman and it targets a range of areas in psycholinguistics and corpus linguistics. More specifically, the Reading Lab focuses on the visuo-oculomotor and cognitive predictors of reading, processing of printed morphologically complex words, and effects of emotion on language production and comprehension. Eye-tracking is the key research paradigm at the Reading Lab. In 2017, the Reading Lab welcomed one new Master's student (Davide Gentile), two new PhD students (Kelly Nisbet and Melda Coskun), and one new post-doctoral researcher (Dr. Aki Kyröläinen). Members of the Reading Lab had a productive 2017 presenting their work at various international conferences, including the European Conference for Eye Movements in Germany and the 10th Morphological Processing conference in Italy. Through Dr. Kuperman's collaboration with "Words in the World (WoW)", a SSHRC Partnered Research Training Initiative, the Reading Lab hosted many researchers from around the world to conduct workshops and/or present at the lecture series at ARiEAL.

Dr. Victor Kuperman demonstrated the eye tracking set-up at the Reading Lab to visiting scholar, Dr. Raymond Bertram (University of Turku, Finland). Photo by J.D. Howell.

IMAGING RESEARCH CENTRE

DIRECTOR: DR. MICHAEL NOSEWORTHY

Dr. Michael Noseworthy is the director of the Imaging Research Centre at St. Joseph's Healthcare Hamilton, which provides the research community with access to the cutting-edge imaging technology (including the GE Healthcare 3T Discovery MR7503T MRI scanner, and the Siemens Biograph-16 PET/CT scanner). In 2017 Dr. Noseworthy's team developed novel imaging technology to assess various forms of diffuse brain injury. For example, concussion, chemobrain chemotherapy-induced brain damage and inflammatory-induced chronic fatigue syndrome. In addition, his team has built MRI hardware and written new pulse sequences for rapidly assessing the high energy phosphates (ATP, PCr, etc.) and intra/extracellular sodium levels within the brain. His team continues to develop novel technology for non-proton based MRI scanning.

THE PHONETICS LAB

DIRECTOR: DR. DANIEL PAPE

Photo by Colin Czerneda.

The Phonetics Lab is directed by Dr. Daniel Pape, and it focuses on experimental phonetics, the link between speech production and speech perception, and the relationship between phonetics and neurolinguistics. More specifically the research at the Phonetics Lab examines the use and interplay of acoustic cues (i.e., cue-weighting) for (1) speech production and perception and (2) articulatory and biomechanical constraints in speech perception. In 2017 the study on perception of acoustic vs articuatory cue -weighting for Canadian English sibilant fricatives continued. The work on the acoustic properties of Polish retroflex fricatives was completed and a new study on the articulatory settings and their relationship to the produced speech sounds for Polish retroflexes was started. Also a new study on the cue-weighting of Canadian English stops was started.

THE REILLY LAB

DIRECTOR: DR. JIM REILLY

Director of *The Reilly Lab*, Dr. Jim Reilly

Dr. Reilly works at the interface of machine learning and signal processing applied to health related problems, particularly in neuroscience and psychiatry. Specific projects in this area are the development of improved machine learning algorithms, diagnosis and treatment of psychiatric illness, prognosis for coma outcome, and the assessment of infant motor movement relating to neurological deficit. In 2017, two of the students (Narges Armanfard and Phil Chrapka) from the Reilly Lab successfully completed their PhD. Together with Dr. Armanfard and other colleagues, Dr. Reilly also filed for the provisional patent for "Expert System for Automatic, Continuous Coma Patient Assessment and Outcome Prediction". While continually being supported by an NSERC Discovery Grant in 2017, the Reilly Lab (with Dr Vickie Galea, PI) was also awarded a grant from the McMaster Interdisciplinary Fund.

THE LANGUAGE AND WORKING MEMORY LAB

DIRECTOR: DR. LISA ARCHIBALD

Director of *The Language and Working Memory Lab*, Dr. Lisa Archibald

The Language and Working Memory Lab is directed by Dr. Lisa Archibald, and is part of the School of Communication Sciences and Disorders at The University of Western Ontario. The Language and Working Memory Lab focuses on investigating how language and memory processes interact in both children learning at a typical rate and those with learning disabilities. In 2017, work continued on the ongoing study examining early indicators of learning in kindergarten to grade 3 children. As well, the Language and Working Memory Lab began partnerships with educational speech-language pathologists in two school boards in Ontario to address questions related to their services for children with communication disorders. In related studies, the Language and Working Memory Lab completed investigations of adult word learning in a variety of contexts.

THE TURKSTRA LAB

DIRECTOR: DR. LYN TURKSTRA

Dr. Turkstra's research focuses on links between cognitive function and social communication in individuals with acquired brain injury. She conducts both experimental and translational research on communication in adolescents and adults, and collaborates on development of practice standards to translate research findings into improved clinical practice. In 2017, undergraduate lab members Jonathan Jin, Noel Kim, and Emily MacIntyre analyzed transcripts of more than 50 typical adolescents in everyday conversations, with assistance from Kathleen Oliver, Graduate Student at the Department of Psychology, Neuroscience & Behaviour. They presented their results at the Hamilton Health Sciences Acquired Brain Injury conference and received a poster award.

Director of *The Turkstra Lab*, Dr. Lyn Turkstra

THE MTBI RESEARCH PROGRAM

DIRECTOR: PROFESSOR CAROL DEMATTEO

As a clinician scientist, Professor Carol DeMatteo has led many research studies in the area of childhood neurotrauma, specifically all severities of acquired brain injury including concussion. Professor DeMatteo is based at CanChild Centre for Childhood Disability Research, and in 2017, her team was wrapping up a prospective cohort study evaluating the effectiveness of Return to Activity and Return to School Guidelines for children and youth with concussion. Professor DeMatteo presented a number of the preliminary results of this study, both nationally and internationally, specifically measuring compliance with Return to Activity and Return to School guidelines at The 12th World Congress on Brain Injury, and The First International Conference on Pediatric Acquired Brain Injury. Concurrently, Professor DeMatteo also started the "Brain Smart – Let's Play Safely!" community project investigating concussion management in organized youth minor sports and the Hamilton Wentworth Catholic District School Board in 2017. Professor DeMatteo also secured funding including private donor funding to complete a systematic review to update the evidence surrounding Return to Activity and Return to School as a part of the process of updating the CanChild Return to Activity and Return to School guidelines. Professor DeMatteo and team work in collaboration on a number of other mild traumatic brain injury projects with The Canadian Concussion Network: Vision for a Network of Centres of Excellence in Concussion, the Ontario Concussion Care Strategy, the Ontario Child Health Support Unit (OSCHU) and the Connect Kids to Care "One Voice": Community of Practice Team in Concussion Management in Youth across Canada.

Director of *The mTBI Research Program,* Professor Carol DeMatteo

THE PERFORMANCE SCIENCE LAB

DIRECTOR: DR. RANIL SONNADARA

Director of *The Performance Science Lab,* Dr. Ranil Sonnadara

The Performance Science Lab is directed by Dr. Ranil Sonnadara, and it studies the way that people learn new skills. The Performance Science Lab is particularly interested in how information flow across the motor and perceptual systems changes with practice, and how feedback and assessment can be effectively implemented to support skill acquisition. The lab also studies ways to optimize performance in high-stakes environments, and how performance can be measured in meaningful ways. In 2017, the Surgical Foundations boot camp implemented by the Performance Science Lab completed a follow up OSCE (objective structured clinical examination) in June. The OSCE data was extremely promising, suggesting that at one-year into training, individuals who completed a boot camp performed significantly better than those who received traditional training (no boot camp) on a variety of focal skills. The Performance Science Lab was also interested in exploring the role of competence committees in competency-based training programs at McMaster. In 2017, the lab began with a survey of key stakeholders across 13 specialties at McMaster in order to understand initial perceptions and experiences of implementing competence committees locally. This work set great foundation in developing guidelines that will help the competency-based training programs with competence committee implementation and decision-making processes.

BY THE NUMBERS

ARiEAL Researchers have been active in dissemination through publishing articles and giving presentations, and have also been successful in securing research funding in 2017.

PUBLICATIONS

ARiEAL researchers published 51 articles and 13 book chapters in 2017. The research topics include but not limited to neuroimaging, word recognition, and applications in acquired brain injury and speech language pathology.

ARTICLES

Acai, A., McQueen, S.A., McKinnon, V., & **Sonnadara, R.R.** (2017). Using art for the development of teamwork and communication skills among healthcare professionals: A literature review. Arts & Health, 9(1): 60-72.

Al-Zanoon, N., Dambacher, M., & **Kuperman, V.** (2017). Evidence for a global oculomotor program in reading. Psychological Research, 81(4): 863-877.

Alloway, T.P., Moulder, R., Horton, J.C., Leedy, A., **Archibald, L.M.D.**, Burin, D., . . . Santos, F.H. (2017). Is it a small world after all? Investigating the theoretical strucutre of working memory cross-nationally. Journal of Cognition and Culture, 17(3): 331-353.

Anderson, C. (2017). Checklists: A simple tool to help students stay organized and motivated. College Teaching, 65(4): 209-210.

Archibald, L.M.D. (2017). SLP-educator classroom collaboration: A review to inform reason based practice. Autism & Developmental Language Impairments, 2: 1-17.

Archibald, L.M.D. (2017). Working memory and language learning: A review. Child Language Teaching and Therapy, 33(1): 5-17.

Armanfard, N., **Reilly, J.P.,** & Komeili, M. (2018). Logistic localized modeling of the sample space for feature selection and classification. IEEE Transactions on Neural Networks and Learning Systems, 29(5): 1396-1413.

Bedell, G., Wade, S., **Turkstra, L.S.**, Krupa, J.H., & King, J. (2017). Informing design of an app based coaching intervention to promote social participation of teenagers with traumatic brain injury. Developmental Neurorehabilitation, 20(7): 408-417.

Berger, I., Obeid, J., Timmons, B.W., & **DeMatteo, C.** (2017). Exploring accelerometer versus self-report sleep assessment in youth with concussion. Global Pediatric Health, 4: 1-9.

Bishop, D.V.M., Snowling, M.J., Thompson, P.A., Greenhalgh, T., & the CATALISE-2 Consortium (incl. **Archibald, L.M.D.** & **Joanisse, M.**) (2017). Phase 2 of CATALISE: A multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology. Journal of Child Psychology and Psychiatry, 58(10): 1068-1080.

Byom, L., & **Turkstra, L.S.** (2017). Cognitive demands and discourse performance after traumatic brain injury. International Journal of Language & Communication Disorders, 52(4): 501-513.

ARTICLES (CONTINUED)

Dona, O., Hall, G.B., & **Noseworthy, M.D.** (2017). Temporal fractal analysis of the rs-BOLD signal identifies brain abnormalities in autism spectrum disorder. PLoS ONE, 12(12): 1-16.

Dona, O., **Noseworthy, M.D.**, **DeMatteo, C.**, & **Connolly, J.F.** (2017). Fractal analysis of brain blood oxygenation level dependent (BOLD) signals from children with mild traumatic brain injury (mTBI). PLoS ONE, 12(1): 1-16.

Dresang, H., & **Turkstra, L.S.** (2017). Implicit causality bias in adults with traumatic brain injury. Journal of Communication Disorders, 71: 1-10.

Gatti, A.A., **Noseworthy, M.D.**, Stratford, P.W., Brenneman, E.C., Totterman, S., Tamez-Peña, J., & Maly, M.R. (2017). Acute changes in knee cartilage transverse relaxation time after running and bicycling. Journal of Biomechanics, 53: 171-177.

Harrison, A.H., **Noseworthy, M.D.**, **Reilly, J.P.**, Guan, W., & **Connolly, J.F.** (2017). EEG and fMRI agree: Mental arithmetic is the easiest form of imagery to detect. Consciousness & Cognition, 48: 104-116.

Ho, R., Hall, G.B., **Noseworthy, M.D.**, & **DeMatteo, C**. (2017). An emotional go/no-go fMRI study in adolescents with depressive symptoms following concussion. International Journal of Psychophysiology, 132: 62-73.

Jared, D.J., Jouravlev, O., & **Joanisse, M.F.** (2017). The effect of semantic transparency on the processing of morphologically derived words: Evidence from decision latencies and event-related potentials. Journal of Experimental Psychology: Learning, Memory, and Cognition, 43(3): 422-450.

Jeong, Y., Law, M., Stratford, P., **DeMatteo, C.**, & Missiuna, C. (2017). Measuring participation of children and environmental factors at home, school, and in community: Construct validation of the Korean PEM-CY. Physical & Occupational Therapy In Pediatrics, 37(5): 541-554.

Keck, C., Creaghead, N., **Turkstra, L.S.**, Vaughn, L., & Kelchner, L. (2017). Pragmatic skills after childhood traumatic brain injury: Parents' perspectives. Journal of Communication Disorders, 69: 106-118.

Kumbhare, D.A., Behr, M., & **Noseworthy, M.D.** (2017). Quantitative ultrasound assessment of myofascial pain syndrome affecting the trapezius: A reliability study. Journal of Ultrasound in Medicine, 36(12): 2559-2568.

Kwok, E.Y.L., **Joanisse, M.F.**, **Archibald, L.M.D.**, Stothers, M.E., Brown, H.M., & Oram Cardy, J. (2017). Maturation in auditory event-related potentials predicts language ability in children. European Journal of Neuroscience, 47(1): 69-76.

Ledoux, A., Barrowman, N., Boutis, K., Davis, A., Reid, S., Sangha, G., . . . **DeMatteo, C.**, Reed, N., & Zemek, R. (2017). Multicentre, randomized clinical trial of paediatric concussion assessment of rest and exertion (PedCARE): A study to determine when to resume physical activities following concussion in children. British Journal of Sports Medicine, 0: 1-12.

Lopata, J.A., Nowicki, E.A., & **Joanisse, M.F.** (2017). Creativity as a distinct trainable mental state: An EEG study of musical improvisation. Neuropsychologia, 99: 246-258.

Lorbergs, A.L., **Noseworthy, M.D.**, & MacIntyre, N. (2017). Magnetic resonance imaging and spectroscopy to assess leg muscle macrostructure and microstructure in healthy older women: A feasibility assessment. Journal of Medical Imaging Radiation Science, 48(1): 43-54.

Lord, M.L., Chettle, D.R., Gräfe, J.L., **Noseworthy, M.D.**, & McNeill, F.E. (2017). Observed retention of gadolinium in bone using a new non-invasive in vivo biomedical device: Results of a small pilot study. Radiology, 287(1): 96-103.

Lord, M.L., McNeill, F.E., Gräfe, J.L., Galusha, A.L., Parsons, P.J., **Noseworthy, M.D.**, . . . Chettle, D.R. (2017). Confirming improved detection of gadolinium in bone using in vivo XRF. Applied Radiation & Isotopes, 120: 111-118.

Maas, A.I., Menon, D.K., Adelson, P.D., Andelic, N., Bell, M.J., Belli, A., . . . InTBIR Participants and Investigators (incl. **DeMatteo, C.**) (2017). Traumatic brain injury: Integrated approaches to improve prevention, clinical care, and research. The Lancet Neurology Commission, 16(12): 987-1048.

McNabb, E., Wong, R., & **Noseworthy, M.D.** (2017). Localizing implanted fiducial markers using undersampled co-RASOR MR imaging. Magnetic Resonance Imaging, 48: 1-9.

Mikkelsen, M., Barker, P.B., Bhattacharyya, P.K., Brix, M.K., Lin, C.-Y.E., **Noseworthy, M.D.**, . . . Edden, R.A.E. (2017). Big GABA: Edited MR spectroscopy at 24 research sites. NeuroImage, 159: 32-45.

Miller-Young, J.E., **Anderson, C.**, Kiceniuk, D., Mooney, J., Riddell, J., Hanbidge, A. S., . . . Chick, N. (2017). Leading up in the scholarship of teaching and learning. The Canadian Journal for the Scholarship of Teaching and Learning, 8(2): 1-14.

Mourad, N., **Reilly, J.P.**, & Kirubarajan T. (2017). Majorization-minimization for blind source separation of sparse sources. Signal Processing, 131: 120-133.

Mueller, K.D., Koscik, R.L., Clark, L.R., Hermann, B.P., Johnson, S.C., & **Turkstra, L.S**. (2017). The latent structure and test-retest stability of connected language measures in the Wisconsin Registry for Alzheimer's Prevention (WRAP). Archives of Clinical Neuropsychology, 1-13.

Narad, M.E., Bedell, G., King, J.A., Johnson, J., **Turkstra, L.S.**, Haarbauer-Krupa, J., & Wade, S.L. (2018). Social Participation and Navigation (SPAN): Description and usability of app based coaching intervention for adolescents with TBI. Developmental Neurorehabilitation, 21(7): 439-448.

Nichols, E.S., & **Joanisse, M.F.** (2017). Individual differences predict ERP signatures of second language learning of novel grammatical rules. Bilingualism: Language and Cognition, 1-15.

Nora, A., Karvonen, L., Renvall, H., Parviainen, T., Kim, J.-Y., **Service, E.**, & Salmelin R. (2017). Children show right-lateralized effects of spoken word-form learning. PLoS ONE, 12(2): 1-20.

Petrelli, T., Farrokhyar, F., McGrath, P., Sulowski, C., Sobhi, G., **DeMatteo, C.**, . . . Singh, S. (2017). The use of Ibuprofen and Acetaminophen for acute headache in the post concussive youth: A pilot study. Paediatrics & Child Health, 22(1): 2-6.

Rockel, C., Akbari, A., Kumbhare, D.A., & **Noseworthy, M.D.** (2017). Dynamic DTI (dDTI) shows differing temporal activation patterns in post-exercise skeletal muscles. Magnetic Resonance Materials in Physics, 30(2): 127-138.

Schmidtke, D. & **Kuperman, V.** (2017). Mass counts in World Englishes: A corpus linguistic study of noun countability in non-native varieties of English. Corpus Linguistics and Linguistic Theory, 13(1): 135-164.

Schmidtke, D., Matsuki, K., & **Kuperman, V.** (2017). Surviving blind decomposition: A distributional analysis of the time-course of complex word recognition. Journal of Experimental Psychology: Learning, Memory and Cognition, 43(11): 1793-1820.

Sharma, V., **DeMatteo, C.**, & Arora, H. (2017). Physical rehabilitation in

minor traumatic injury or concussion. The Indian Journal of Neurotrauma, 14(1): 56-58.

Stazyk, K., **DeMatteo, C.,** Moll, S., & Missiuna, C. (2017). Depression in children recovering from concussion: Correlates and predictors. Brain Injury, 31(5): 631-638.

Thompson, S.J., Riazi, S., **Noseworthy, M.D.**, Rayner, T.E., Kraeva, N., Schneiderman, J.E., . . . Wells, G.D. (2017). Skeletal muscle metabolic dysfunction in patients with malignant hyperthermia susceptibility. Anesthesia & Analgesia, 125(2): 424-441.

Turkstra, L.S., Duff, M.C., Politis, A.M., & Mutlu, B. (2017). Detection of text-based social cues in adults with traumatic brain injury. Neuropsychological Rehabilitation, 1-16.

Turkstra, L.S., Kraning, S.G., Riedeman, S.K., Mutlu, B., Duff, M.C., & VanDenHeuvel, S. (2017). Labelling facial affect in context in adults with and without TBI. Brain Impairment, 18(1): 49-61.

Wagner, N., Fahim, C., Dunn, K., Reid, D., & **Sonnadara, R.R.** (2017). Otolaryngology residency education: A scoping review on the shift towards competency based medical education. Clinical Otolaryngology, 42(3): 564-572.

Warriner, A.B., Shore, D.I., Schmidt, L.A, Imbault, C.L., & **Kuperman, V.** (2017). Sliding into happiness: A new tool for measuring affective responses to words. Canadian Journal of Experimental Psychology, 71(1): 71-88.

Wells, G.D., Banks, L., Caterini, J.E., Thompson, S., **Noseworthy, M.D.**, Rayner, T., . . . Hamilton, J. (2017). The association among skeletal muscle phosphocreatine recovery, adiposity, and insulin resistance in children. Pediatric Obesity, 12(2): 163-170.

Wong, O.L., Lo, G.G., Yuan, J., Chung, W.K., Ho, W.H.B., & **Noseworthy, M.D.** (2017). Evaluation and minimization of the pseudohepatic anisotropy artifact in liver intravoxel incoherent motion (IVIM). Journal of Computer Assisted Tomography, 41(5): 679-687.

Wong, S.E., Maida, E., Harvey, D., Wagner, N., **Sonnadara, R.R.**, & Amin, N. (2017). Evaluation of a physiatrist-directed prehabilitation intervention in frail colorectal cancer patients: A randomised pilot study protocol. BMJ Open, 7(6): 1-7.

Żygis, M., **Pape, D.**, Koenig, L.L., Jaskuła, M., & Jesus, L.M.T. (2017). Segmental cues to intonation of statements and polar questions in whispered, semi-whispered and normal speech modes. Journal of Phonetics, 63: 53-74.

BOOK CHAPTERS

Allison, K.M., Byom, L.J., & **Turkstra, L.S.** (2017). Traumatic Brain Injury in Children and Adolescents. In A. Johnson & B. Jacobson., Medical Speech-Language Pathology: A Practitioner's Guide (3rd Edition). New York, NY: Thieme.

Bartošová, J. & **Kučerová, I.** (2017). Instrumental Situations: On Case Marking in Copular Clauses in Czech. In Y. Oseki, M. Esipova & S. Harves (Eds.), Annual Workshop on Formal Approaches to Slavic Linguistics. The New York City Meeting (pp. 50-70). Ann Arbor, MI: University of Michigan Press.

Ciucci, M., Montgomery, E.B., & **Turkstra, L.S.** (2017). Neurophysiology. In B. Rousseau & R. Branski (Eds.), Anatomy and Physiology of Speech and Hearing. New York, NY: Thieme.

DeCaire, R., Johns, A., & **Kučerová, I.** (2017). On Optionality in Mohawk Noun Incorporation. In R. Maddeaux (Ed.), Toronto Working Papers in Linguistics (pp. 1-10). Toronto, ON: University of Toronto Press.

DeMatteo, C., Reed, N., & Stazyk, K. (2017). The Role of the Occupational Therapist in Concussion Management: What Can the Occupational Therapist Do? In I. Gagnon, & A. Ptito (Eds.), Sports Concussions: A Complete Guide to Recovery and Management. Boca Raton, FL: CRC Press.

Dočekal, M. & **Kučerová, I.** (2017). Total vs Partial Adjectives. Evidence from Reduplication. In M.D. Kliffer, A Sévigny, P.C. Sutcliffe, W.J. Sullivan & D.S. Mailman (Eds.), LACUS Forum 37: Communication and Cognition: Multidisciplinary Perspectives. (pp. 59-68). Houston, TX: StudioMindStride.

Johns, A. & **Kučerová, I.** (2017). On the Morphosyntactic Reflexes of Information Structure in the Ergative Patterning of the Inuit Language. In J. Coon, D. Massam & L. Trevis (Eds.), Linguistics Handbook of Ergativity (pp. 397-418). Oxford, UK: Oxford University Press.

Kučerová, I. (2017). Beyond Russian: On Dnom, Person and Case. In C. Halpert, H. Kotek & C. van Urk (Eds.), A Pesky Set: Papers for David Pesetsky (pp. 263-272). Cambridge, MA: Massachusetts Institute of Technology Press.

Kučerová, I. (2017). Labeling of DP Coordinations and the Lack of φ-feature Resolution in Syntactic Agree. In A. Lamont & K. Tetzloff (Eds.), NELS 47: Proceedings of the Forty-Seventh Annual Meeting of the North East Linguistics Society (pp. 211-220). Amherst, MA: University of Massachusetts Press.

Montgomery, E.B., **Turkstra, L.S.**, & Ciucci, M. (2017). Suprasegmental Motor Control. In B. Rousseau & R. Branski (Eds.), Anatomy and Physiology of Speech and Hearing. New York, NY: Thieme.

Service, E. (2017). Työmuisti ja Kieli (Working Memory and Language). In A. Klippi, A. Korpijaakko-Huuhka, M. Lehtihalmes & P. Rautakoski (Eds.), Afasia-aikuisiän Kielihäiriöiden Aivoperusta ja Kuntoutus. (Aphasia-brain Substrate and Rehabilitation of Adult-age Language Impairments). (pp. 42-54). Helsinki, FI: Gaudeamus.

Turkstra, L.S. (2017). Language Entries. In J. Kreutzer, J. DeLuca, & B. Caplan (Eds.), Encyclopedia of Clinical Neuropsychology (2nd Edition). Berlin, DE: Springer-Verlag Berlin Heidelberg.

Turkstra, L.S. & Politis, A. (2017). Traumatic Brain Injury. In L. Cummings (Ed.), Research in Clinical Pragmatics: Perspectives in Pragmatics, Philosophy & Psychology. Berlin, DE: Springer-Verlag Berlin Heidelberg.

OPEN ACCESS

ARiEAL endeavours to support Open Access in research. In addition to publishing in Open Access journals, ARiEAL started archiving representative publications from our researchers at MacSphere (McMaster University's Institutional Repository). This Open Access initiative commenced in 2017 and is continually progressing.

PRESENTATIONS

ARiEAL researchers presented 32 invited talks and 32 peer-reviewed conference presentations across continents in 2017.

Acai, A., Kalun, P., Wilcox, J., Reid, S., & **Sonnadara, R.R.** (2017, April). Breaking through the glass ceiling: An interactive discussion about challenges and opportunities related to gender issues in surgery. Presented at the Association for Surgical Education Annual Meeting, San Diego, USA.

Acai, A., McQueen, S.A., Fahim, C., Wagner, N., Boston, J., Maxwell, C., & **Sonnadara, R.R.** (2017, June). It's not the form; it's the process: A phenomenological study on the use of creative professional development workshops to improve teamwork and communication skills. Presented at the McMaster University Health Science Education Research Day, Hamilton, Canada.

Archibald, L. (2017, May). Morphological awareness: Why it makes sense. Presented at the Dufferin-Peel Catholic School Board, Mississauga, Canada (Invited).

Connolly, J. (2017, July). Neurolinguistics: Indispensable in the assessment of cognitive function in brain injury. Presented at the Linguistic Association of Canada and the United States Forum, Hamilton, Canada (Invited).

Connolly, J. (2017, November). mTBI in youth and retired CFL athletes: Neurocognitive signs of abnormalities across the lifespan. Presented at the Linguistic Association of Canada and the United States Forum, Hamilton, Canada (Invited).

Connolly, J. (2017, December). Language comprehension, conscious awareness, the brain… and what happens when it all goes wrong. Presented at the Canadian Network for Third Age Learning Annual Meeting, Burlington, Canada (Invited).

DeMatteo, C. (2017, June). Measuring compliance with management protocols: Post-concussion management in children and youth as the working example. Presented at the McMaster University School of Rehabilitation Science Research Round Annual Meeting, Hamilton, Canada (Invited).

DeMatteo, C. (2017, October). Pediatric concussion research in Hamilton. Presented to the Hamilton-Wentworth Catholic District School Board, Hamilton, Canada (Invited).

DeMatteo, C. (2017, November). Ripping off the band-aid: Learning from injuries of sport's past to improve safety in sports today. Presented at the Brain Smart Hamilton Annual Meeting, Hamilton, Canada (Invited).

Doughty, M.W., **Noseworthy, M.D.**, Boshra, R., Ruiter, K.I., & **Connolly, J.** (2017, April). Assessing functional and structural connectivity in ex-professional athletes. Presented at the International Society for Magnetic Resonance in Medicine Annual Meeting, Honululu, USA.

Gauvin-Lepage, J., Friedman, D., Grilli, L., Sufrategui, M., **DeMatteo, C.**, Iverson, G.L., & Gagnon, I. (2017, September). Quality of life and mood of youth who are slow to recover after concussion and participating in an exercise-based active rehabilitation intervention. Poster presented at the International Conference on Paediatric Acquired Brain Injury, Rome, Italy.

Greencorn, M., & **Service, E.** (2017, August). Compound conceptual relations in working memory: Evidence for relation priming? Presented at the Linguistic Association of Canada and the United States Forum, Hamilton, Canada.

Grool, A., **DeMatteo, C**., Reed, N., & Zemek, R. (2017, September). Patient, parent, and educator perspectives on paediatric concussion and most important outcome priorities: A quantitative study. Presented at the International Conference on Paediatric Acquired Brain Injury, Rome, Italy.

Henry, R., Van Dyke, J., & **Kuperman, V.** (2017, August). Oculomotor control in visual tasks predicts reading skill regardless of scanning direction. Presented at the European Conference for Eye Movements, Wuppertal, Germany.

Ho, R., Hall, G., **Noseworthy, M.**, & **DeMatteo, C.** (2017, January). Emotion-mediated executive function in adolescents with post-concussive depressive symptoms. Presented at the Research on the Concussion Spectrum of Disorders Symposium Annual Meeting, Toronto, Canada.

Imbault, C., Warriner, A.B., Titone. D., & **Kuperman, V.** (2017, November). How do you feel words in your second language? Presented at the Psychonomic Society of Canada Annual Meeting, Vancouver, Canada.

Joanisse, M.F. (2017, February). Language and reading disorders in children: What's the role of phonology? Presented at the University of Delaware Communication Sciences and Disorders Colloquium, Newark, USA (Invited).

Kučerová, **I.** (2017, August). Grammatical vs semantic agreement: A case study of locality at the CI interface. Presented at the University of Connecticut, Storrs, USA (Invited).

Kučerová, I. (2017, August). Interpretability of phi-features. Presented at the Federal University of Rio de Janeiro Department of Linguistics and Philology, Rio de Janeiro, Brazil (Invited).

Kučerová, I. (2017, September). On the role of Person in the mapping of syntactic features onto their semantic representation. Presented at the Manitoba Workshop on Person, Manitoba, Canada (Invited).

Kučerová, I. (2017, November). Phi-features at the syntax-semantics interface: Toward distributed semantics. Presented at the Biolinguistic Conference on Interface Asymmetries, New York, USA (Invited).

Kučerová, I. (2017, December). Associative plurals are phase-bound: Towards a syntactic theory of semantic number. Presented at the Formal Language Structures Association Annual Meeting, Paris, France (Invited).

Kučerová, I., & Szczegielniak, A. (2017, April). A dual theory of roots: Evidence from gender-marking languages. Presented at the West Coast Conference on Formal Linguistics, Calgary, Canada (Invited).

Kuperman, V. (2017, February). R for language research. Presented at the Hebrew University of Jerusalem, Jerusalem, Israel (Invited).

Kuperman, V. (2017, June). Survival analysis: A tool for timing semantic and formal effects on derived and compound word recognition. Presented at the Morphological Processing Conference, Trieste, Italy (Invited).

Kuperman, V. (2017, August). Studying reading with eye-tracking. Presented at the Linguistic Association of Canada and the United States Forum, Hamilton, Canada (Invited).

Kuperman, V. (2017, October). What does it mean to know a word? Presented at the University of Buffalo Department of Psychology Colloquium, Buffalo, USA (Invited).

Kuperman, V., & Rahmanian, S. (2017, August). The effect of misspellings on reading of correctly spelled words across paradigms and languages. Presented at the European Conference for Eye Movements, Wuppertal, Germany.

Kuperman, V., & Snefjella, B. (2017, August). Individual differences and word context affect word learning. Presented at the European Conference for Eye Movements, Wuppertal, Germaby.

Kuperman, V., & Snefjella, B. (2017, November). Statistical learning affects orthographic and semantic aspects of word learning. Presented at the Psychonomic Society Annual Meeting, Vancouver, Canada.

Laasonen, M., Lahti-Nuuttila, P., Smolander, S., Arkkila, E., Porokuokka, I., & **Service, E.** (2017, July). Relations between nonverbal serial short-term memory and vocabulary in typical and impaired language acquisition: Results from the HelSLI study. Presented at the International Conference for the Study of Child Language, Lyon, France.

McCarthy, C., Fahim, C., Khanna, V., & **Sonnadara, R.R.** (2017, June). Development, implementation, and evaluation of a preoperative planning case review tool for life long learners. Presented at the McMaster University Health Science Education Research Day, Hamilton, Canada.

McCarthy, C., McGuire, A., Kalun, P., Acai, A., Wagner, N., Wilcox, J., Petrisor, B., & **Sonnadara, R.R.** (2017, June). Designing and piloting intraoperative videos for orthopaedic surgical training. Presented at the McMaster University Health Science Education Research Day, Hamilton, Canada.

McCarthy, C., McGuire, A., Kalun, P., Wilcox, J., Acai, A., Wagner, N., Petrisor, B., & **Sonnadara, R.R.** (2017, June). Designing and piloting intraoperative videos for orthopaedic surgical training. Presented at the Canadian Orthopaedic Association Annual Meeting, Ottawa, Canada.

McKenny, P., Varanese, J., & **Anderson, C.** (2017, November). Program review: Nightmare or dream come true with student-staff-faculty partnerships? Presented at the Research on Teaching and Learning Conference, Hamilton, Canada.

McKinnon, V., Kalun, P., Fahim, C., McRae, M., & **Sonnadara, R.R.** (2017, June). A shift on the horizon: A systematic review of assessment tools

PRESENTATIONS (CONTINUED)

for plastic surgery trainees. Presented at the McMaster University Health Science Education Research Day, Hamilton, Canada.

McQueen, S.A., Cook, M., Muir, C., Pecchia, L., Castaldo, R., **Sonnadara, R.R.**, Seemann, N., & Moulton, C. (2017, February). The shaky scalpel: Understanding acute surgeon stress in the operating room. Presented at the University of Toronto Medical Student Research Day, Toronto, Canada.

McQueen, S.A., Cook, M., Muir, C., **Sonnadara, R.R.**, & Moulton, C. (2017, November). The shaky scalpel: Understanding acute surgeon stress in the operating room. Presented at the Canadian Society for Clinical Investigation-Clinical Investigator Trainee Association of Canada Annual Meeting, Toronto, Canada.

Mueller, V., Ellis, S., Murray Davis, B., **Sonnadara, R.R.**, & Grierson, L. (2017, October). Improving the efficiency and effectiveness of a simulation program to meet the demands of CBD: The use of a multi-level, multi-learner, multi-competency approach. Presented at the International Conference of Residency Education, Quebec City, Canada.

Noseworthy, M.D. (2017, May). A tour inside MRI RF (Radiofrequency) coils and what makes them work. Presented at the GE Healthcare MRI Symposium, Halifax, Canada (Invited).

Noseworthy, M.D. (2017, May). The current status of gadolinium (Gd) safety. Presented at the GE Healthcare MRI Symposium, Halifax, Canada (Invited).

Noseworthy, M.D. (2017, October). Advanced MRI Approaches to identify damage in mild traumatic brain injury (mTBI). Presented at the Philips Healthcare Medical Imaging Physics Annual Meeting, Hamburg, Germany (Invited).

Noseworthy, M.D. (2017, November). Magnetic Resonance Imaging (MRI) and concussion. Presented at the Brain Smart Hamilton Symposium, Hamilton, Canada (Invited).

Noseworthy, M.D., Stillo, D., Ho, R., **Connolly, J.**, & **DeMatteo, C.** (2017, October). Patient-specific assessment of mild traumatic brain injury (mTBI) in children using Z-Scored diffusion tensor imaging (DTI). Presented at the European Society for Magnetic Resonance in Medicine and Biology Annual Meeting, Barcelona, Spain.

Reid, D., Kalun, P., Nayan, S., Choi, D., Wagner, N., Bouvier, S., Wilcox, J., & **Sonnadara, R.R.** (2017, October). Developing and implementing competency-based assessment tools in otolaryngology: Head and neck surgery. Presented at the International Conference of Residency Education, Quebec City, Canada.

Reilly, J. et al. (2017, October). Developing artificial intelligence tools for the diagnosis and treatment of mood disorders and schizophrenia. Presented at the Brazilian Congress of Psychiatry Annual Meeting, Sao Paulo, Brazil (Invited).

Schmidtke, D., Gagne, C., **Kuperman, V.,** & Spalding, T. (2017, June). The role of competition between conceptual relations during compound word recognition: Evidence from spoken and visual word recognition. Presented at the Morphological Processing Conference, Trieste, Italy.

Schmidtke, D., Gagne, C., **Kuperman, V.**, Spalding, T., & Tucker, B. (2017, November). Conceptual relations compete during auditory and visual compound word recognition. Presented at the Psychonomic Society Annual Meeting, Vancouver, Canada.

Schmidtke, D., Warriner, A.B., **Kuperman, V.**, & **Moro, A.** (2017, August). How L2 instruction influences eye-movements during reading: A within-participant study of English learners. Presented at the European Conference for Eye Movements, Wuppertal, Germany.

Service, E. (2017, August). Laying the foundations to language: What nonword repetition has taught us about language acquisition. Presented at the Linguistic Association of Canada and the United States Forum, Hamilton, Canada (Invited).

Service, E., & Shekari, E. (2017, November). Working memory for instructions in a dominant and non-dominant language. Presented at the Psychonomic Society Annual Meeting, Vancouver, Canada.

Snefjella, B., Schmidke, D., & **Kuperman, V.** (2017, January). National character stereotypes correspond to a Nation's distinctive words. Presented at the Society for Personality and Social Psychology Annual Meeting, San Antonio, USA.

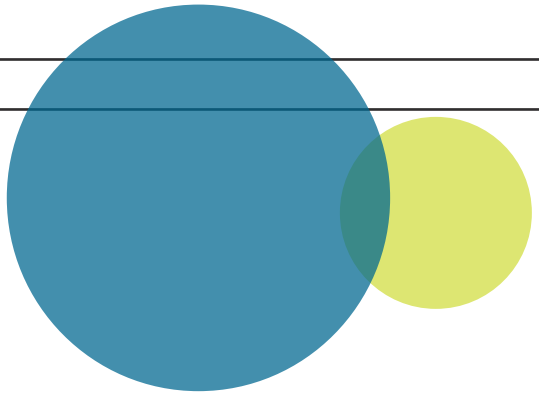
Turkstra, L. (2017, February). Cognitive-communication disorders in adolescents and adults with TBI: What can we do and when should we do it? Presented at the G. Paul Moore Symposium, Gainesville, USA (Invited).

Turkstra, L. (2017, March). Making the most of a short in-patient stay. Presented at the Duke University Hospital Department of Speech-Language Pathology, Durham, USA (Invited).

Turkstra, L. (2017, June). Executive functions in students with acquired brain injury. Presented at the Ontario Speech-Language Pathology and Audiology Association Annual Meeting, Toronto, Canada (Invited).

Turkstra, L. (2017, September). Cognitive rehabilitation or rehabilitation of people with cognitive impairments? Presented at the State University of New York at Buffalo Continuing Education Workshop, Buffalo, USA (Invited).

Turkstra, L. (2017, October). Social cognition and communication in adolescents. Presented at the American Congress of Rehabilitation Medicine Annual Meeting, Atlanta, USA (Invited).



Turkstra, L. (2017, November). Social communication in traumatic brain injury. Presented at the American Speech-Language-Hearing Association Annual Meeting, Los Angeles, USA (Invited).

Turkstra, L. (2017, November). What are we actually doing in therapy for cognitive and communication disorders? Presented at the New England Symposium for Speech-Language Professionals, Worcester, USA (Invited).

Turkstra, L. (2017, November). What is the goal of in-patient rehabilitation for cognitive-communication disorders? Presented at American Speech-Language-Hearing Association Annual Meeting, Los Angeles, USA (Invited).

Wagner, N., Amin, N., McCarthy, C., & **Sonnadara, R.R.** (2017, March). Conflicting opinions on the use of simulation for nontechnical skill development at the onset of residency training. Presented at the American College of Surgeons Annual Meeting, Chicago, USA.

Wagner, N., Chan, M., Amin, N., & **Sonnadara, R.R.** (2017, October). Off-loading the assessment burden: Are peers reliable assessors? Presented at the International Conference of Residency Education, Quebec City, Canada.

Wagner, N., Chan, M., Wilcox, J., Amin, N., Kelly, S., & **Sonnadara, R.R.** (2017, April). Evaluating the development, implementation, and effectiveness of a surgical foundations boot camp. Presented at the Association for Surgical Education Annual Meeting, San Diego, USA.

Wilcox, J., Ewers, N., & **Sonnadara, R.R.** (2017, June). The effect of music in the OR on surgical trainees. Presented at the McMaster University Health Science Education Research Day, Hamilton, Canada

GRANTS

ARiEAL researchers started 23 research grants as Principal Investigator or Co-investigators in 2017. Funding totaled over 1.6 million dollars across these newly commenced projects.

Funding sources include Canadian Institutes of Health Research (CIHR), Natural Sciences and Engineering Research Council (NSERC), Social Sciences and Humanities Research Council (SSHRC), Shared Hierarchical Academic Research Computing Network (SHARCNET) and various institutional and local organizations.

Anderson, C. (Principal Investigator). Essentials of Linguistics. eCampusOntario Open Textbook Initiative Grant: $15,000, 2017-2018.

Cardy, J. (Principal Investigator) & **Archibald, L.** (Co-investigator). Clinical and Applied Research Excellence in Speech-Language Pathology. University of Western Ontario Institutional Grant: $5,000, 2017-2018.

Cardy, J. (Principal Investigator) & **Archibald, L.** (Co-investigator). Establishing a Centre for Clinical and Applied Research Excellence in Speech Language Pathology at the University of Western Ontario. University of Western Ontario Institutional Grant: $50,000, 2017-2018.

DeMatteo, C. (Principal Investigator). CanChild Pediatric Concussion Management Guidelines: Time to Update. CanChild Centre for Childhood Disability Research Institutional Grant: $10,000, 2017-2018.

DeMatteo, C. (Principal Investigator), Trim, Z., Candlish, J., Macnamara, K., Young, G., King, M., Harris, T., Underhill, C., Nicholson, A., Rogano, A., Hucal, M., Madalena, J., Mancini, J., & Dudeck, D. (Co-investigators). Brain Smart Hamilton: "Let's Play Safely!". Hamilton Community Foundation Research Grant: $29,964, 2017-2018.

DeMatteo, C. (Principal Investigator). mTBI Research. The Inglis Family Foundation Grant: 25,000, 2017-2021.

DeMatteo, C. (Principal Investigator). mTBI Research. The Inglis Family Foundation Grant: $1,000. 2017-2018.

DeMatteo, C. (Principal Investigator). mTBI Research. The Jack and Ina Pollock Foundation Grant: $5,000. 2017-2018.

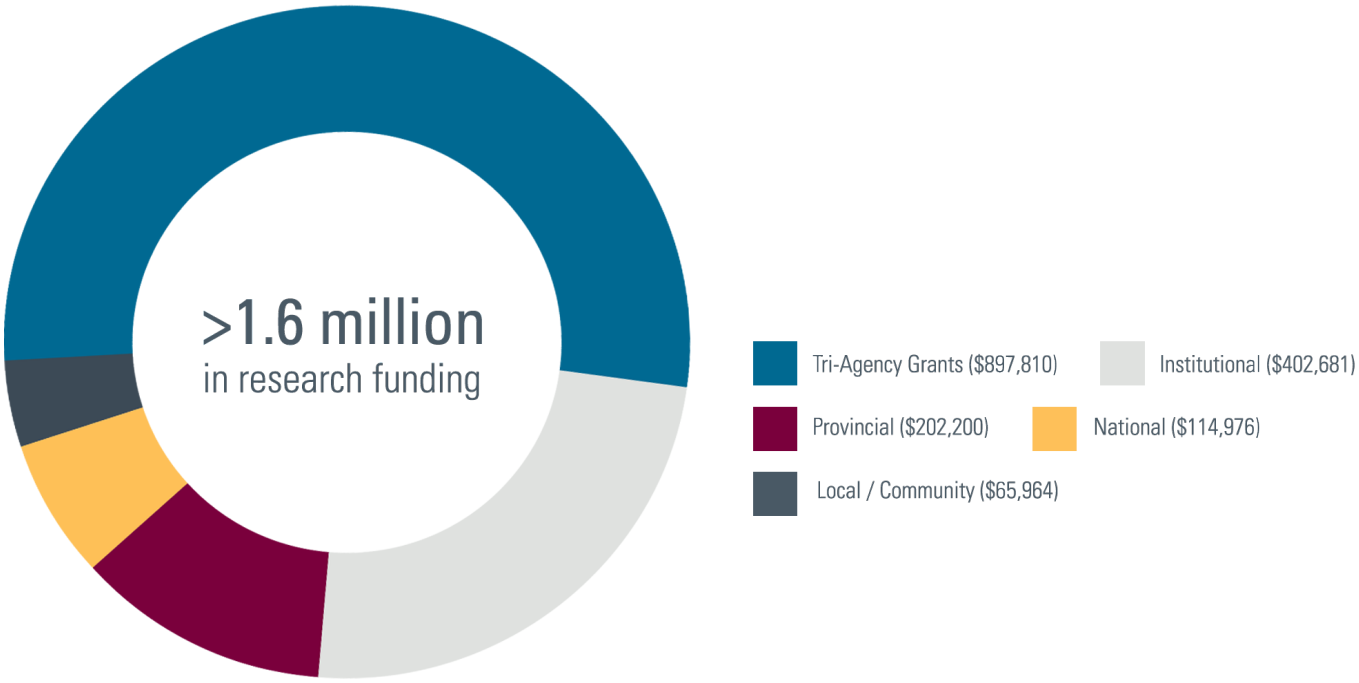
Galea, V. (Principal Investigator), **Reilly, J.** & **Sonnadara, R.R.** (Co-investigators). Quantitative Modelling of Spontaneous Movement in Infants: Development and Validation of a Machine-learning Approach. McMaster University Interdisciplinary Research Fund Grant: $20,000, 2017.

Galea, V. & **Reilly, J.** (Co-principal Investigators). Quantitative Modeling of Spontaneous Movements in Infants. McMaster Faculty of Science Interdisciplinary Project Seed Fund Grant: $50,000, 2017.

Joanisse, M.F. (Principal Investigator). Equipment Funding. NVidia Corporation Grant: $1,000, 2017-2018.

Moulton, C. (Principal Investigator), McQueen, S.A., Mobilio, M.H., McGregor, C., & **Sonnadara, R.R.** (Co-investigators). The Shaky Scalpel: Investigating the Phenomenon of Stress in the Practice of Surgical Oncology. Princess Margaret Cancer Center Foundation Grant: $5,000, 2017.

Noseworthy, M.D. (Principal Investigator). Advanced Magnetic Resonance Techniques for Rapid Non-invasive Monitoring of Neuromuscular Activity. Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant: $230,000, 2017-2021.



GRANTS (CONTINUED)

Rafat, Y. (Principal Investigator) & **Joanisse, M.F.** (Co-investigator). Second Language Speech Production, Processing and Reading of Highly Proficient Bilinguals Living in Canada. Natural Sciences and Engineering Research Council of Canada (NSERC) Insight Development Grant: $67,286, 2017-2019.

Reed, N. (Principal Investigator), Fuselli, P., **DeMatteo, C.**, Ellis, M., Hung, R., Hunt, A., Hutchison, M., Kroshus-Havril, E., Markham, C., Provvidenza, C., Russell, K., Scratch, S., Tator, C., & Zemek, R. (Co-investigators). Concussion & You: A Peer-Led Approach to Raising Concussion Awareness in Canadian High Schools. Canadian Institute of Health Research (CIHR) Grant: $600,524, 2017-2021.

Service, E. (Principal Investigator), Connelly, C., Černe, M., & Svedholm-Häkkinen, A.M. (Co-investigators). Costs and Benefits of Using a Non-Dominant Language in Simulated Work Tasks. McMaster University Arts Research Board Institutional Grant: $13,320, 2017-2018.

Simunovic, M. (Principal Investigator), Meyers, B., Yemen, B., Forbes, S., Eskicioglu G., Tsai, S., Rebello, R., Wong, R., Fahim, T., & **Sonnadara, R.R.** (Co-investigators). Piloting and Evaluating the 'Audit and Feedback, and, Reminders using Electronic Databases in Rectal Cancer' (ARED-RC) Intervention in LHIN4. Hamilton Academic Health Sciences Organization Innovation Fund Grant: $174,220, 2017.

Sonnadara, R.R. (Principal Investigator), Khedri, R., Pfaff, T., Godsmark, R., Badawy, G., & Ghosh, S. Development of the CanIDS Aggregation and Visualization Platform. CANARIE Joint Security Project Grant: $84,976, 2017.

Sonnadara, R.R. (Principal Investigator), Britten, J. & Guan, W. (Co-investigators). Extending MAX3D. Shared Hierarchical Academic Research Computing Network (SHARCNET) Dedicated Programming Competition Round VIII Grant: $30,000, 2017.

Sonnadara, R.R. & Amin, N. (Co-principal Investigators), Kelly, S. & Wagner, N. (Co-investigators). Promoting Simulation Training in Residency Education. McMaster Surgical Associates Education Research Grant: $29,942, 2017.

Sonnadara, R.R. & Kelly, S. (Co-principal Investigators), Acai, A., Fahim, C., & Reid, D. (Co-investigators). Examining the Implementation and Functioning of Competence Committees in Surgical Training. McMaster Surgical Associates Education Research Grant: $20,884, 2017.

Sonnadara, R.R. & Petrisor, B. (Co-principal Investigators), & Kalun, P. (Co-investigator). Development of a Comprehensive Assessment Framework in Orthopaedics. McMaster Surgical Associates Education Research Grant: $29,306, 2017.

Frey, B.N. (Principal Investigator), **Noseworthy, M.D.**, Mishra, R., Kapczinski, F., & Minuzzi, L. (Co-investigators). A Translational Study of Blood-brain Barrier Disruption in Bipolar Disorder: Implications for a New Pathway for Drug Development. Physician Services Incorporated (PSI) Foundation Research Grant: $187,200, 2017-2019.

IMPACT

ARiEAL aims to expanding the research reach beyond the traditional means and to engage the broader community. In 2017, we started showcasing our research excellence through our website, Twitter and open access repository. Various talks and workshops were hosted to provide opportunities for interdisciplinary, experiential, and problem-based learning for our trainees and community.

ENGAGEMENT

On February 1, 2017, ARiEAL officially launched its website as a platform to share our research knowledge with a broader community beyond borders. This map highlighted the TOP 20 countries where our website visitors come from. Our official Twitter account further facilitates the research community engagement. In 2017, we've reached a total of 34,046 impressions with 74 tweets and had over 1,000 engagement counts.

LECTURE SERIES

In 2017, ARiEAL co-hosted nine "Cognitive Science of Lecture Series" talks and one Career Workshop with the Department of Linguistics & Languages. We invited renowned researchers and experts from various parts across the world to share their expertise with us. Together, ARiEAL also co-hosted the 5th annual Montreal-Ottawa-Toronto-Hamilton Conference on Syntax (MOTH 5) with the Department of Linguistics & Languages. MOTH 5 is a venue for graduate students to present their ongoing work and to get feedback from faculty and fellow students.

COGNITIVE SCIENCE OF LANGUAGE LECTURE SERIES TALKS

Dr. Jessica Coon, Associate Professor, Department of Linguistics, McGill University: Montréal, Canada. The Linguistics of Arrival: Aliens, Fieldwork and Universal Grammar. January 25, 2017.

Dr. Khalil Iskarou, Assistant Professor, Department of Linguistics, University of Southern California: Los Angeles, USA. Discreteness and Dynamics in Computation: From Octopus Behavior to Language. February 8, 2017.

Dr. Lucie Ménard, Adjunct Professor, School of Communication Sciences and Disorders, McGill University: Montréal, Canada. Multisensory Speech Perception and Production. March 8, 2017.

Dr. John Anderson, Postdoctoral Fellow, Department of Psychology, York University: Toronto, Canada. Imaging the Aging Bilingual Brain. March 22, 2017.

Dr. Suzi Lima, Assistant Professor, Department of Spanish & Portuguese, University of Toronto: Toronto, Canada. The Role of Count Lists in the Acquisition of Numerals. April 5, 2017.

Dr. Doug Whalen, Vice President of Research, Haskins Laboratories, Yale University: New Haven, USA. Characteristics and Usefulness of Phonetic Variability. October 18, 2017.

Dr. Sascha Schroeder, Adjunct Researcher, Center for Lifespan Psychology, Max Planck Institute for Human Development: Berlin, Germany. Decomposing the Frequency by Skill Interaction. November 1, 2017.

Dr. Elissa Asp, Professor, English Department and Linguistics Program, Saint Mary's University: Halifax, Canada. Brain Imaging in Research on Language. November 15, 2017.

Dr. Arsalan Kahnemuyipour, Associate Professor, Department of Language Studies, University of Toronto: Toronto, Canada. Nominal Linkers: The Case of Ezafe in Iranian Languages. November 29, 2017.

MCMASTER UNIVERSITY DEPARTMENT OF LINGUISTICS & LANGUAGES CAREER WORKSHOP

Dr. Anna Marie Trester, Creator of CareerLinguist.com. Bringing Linguistics to Work(shop). September 13, 2017.

5TH ANNUAL MONTREAL-OTTAWA-TORONTO-HAMILTON CONFERENCE ON SYNTAX (MOTH 5)

Keynote Speakers:
Dr. Brian Dillon, Associate Professor, Department of Linguistics, University of Massachusetts Amherst: Amherst, USA.

Dr. Susana Béjar, Assistant Professor, Department of Linguistics, University of Toronto: Toronto, Canada.

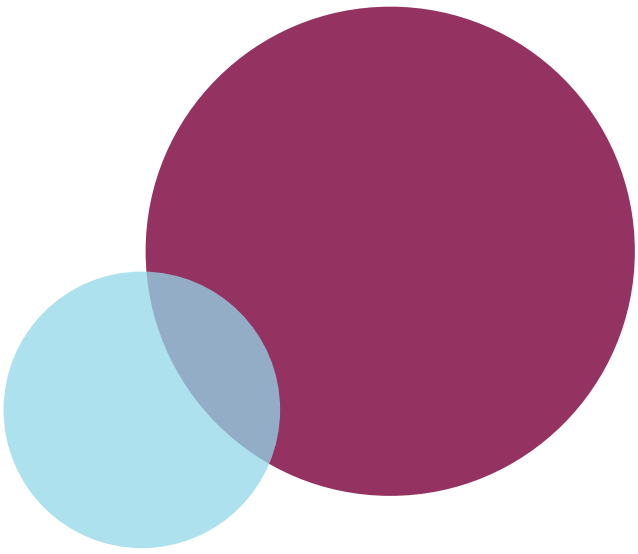
WORKSHOPS

ARiEAL hosted three specialized workshops on statistical analyses and EEG pipeline in 2017 with experts from Montreal (Canada), Berlin (Germany) and Jerusalem (Israel).

Dr. Stefanie Blain-Moraes, Assistant Professor, School of Physical & Occupational Therapy, McGill University: Montréal, Canada. New EEG Pipeline. March 28, 2017.

Dr. Sascha Schroeder, Adjunct Researcher, Center for Lifespan Psychology, Max Planck Institute for Human Development: Berlin, Germany. Analyzing Interactions and Non-Linear Effects in Mixed-Effect Models. November 4, 2017.

Noam Siegelman, Department of Cognitive Sciences, The Hebrew University of Jerusalem: Jerusalem, Israel. Bayesian Statistics. November 22, 2017.



THE CENTRE

Founded in late 2016, the year of 2017 marked the first full calendar year since our inception. It is a collective effort that we are able to celebrate success achieved in 2017.

MEMBERS

FOUNDING DIRECTOR

John Connolly (Department of Linguistics & Languages, McMaster University)

ASSOCIATE DIRECTOR

Anna Moro (Department of Linguistics & Languages, McMaster University)

FULL MEMBERS

Catherine Anderson (Department of Linguistics and Languages, McMaster University)

Marc Joanisse (Department of Psychology, University of Western Ontario)

Ivona Kučerová (Department of Linguistics & Languages, McMaster University)

Victor Kuperman (Department of Linguistics & Languages, McMaster University)

Michael Noseworthy (Department of Electrical & Computer Engineering, McMaster University)

Daniel Pape (Department of Linguistics & Languages, McMaster University)

Jim Reilly (Department of Electrical & Computer Engineering, McMaster University)

Elisabet Service (Department of Linguistics & Languages, McMaster University)

Lyn Turkstra (School of Rehabilitation Science, McMaster University)

ASSOCIATE MEMBERS

Lisa Archibald (Department of Psychology, University of Western Ontario)
Carol DeMatteo (School of Rehabilitation Science, McMaster University)
Paul Grunthal (McMaster Industry Liaison Office, McMaster University)
Patty Solomon (School of Rehabilitation Science, McMaster University)
Ranil Sonnadara (Department of Surgery, McMaster University)

COLLABORATOR

Tsee Leng Choy (Department of Psychology, HELP University, Kuala Lumpur, Malaysia)

TRAINEES

POSTDOCTORAL FELLOWS

Sinisa Colic (Co-supervised by Drs. Jim Reilly and Gary Hasey)
Kiret Dhindsa (Supervised by Dr. Ranil Sonnadara)
Michel Genereux (Supervised by Dr. Victor Kuperman)*
Amy Harrison (Supervised by Dr. Michael Noseworthy)*
Aki-Juhani Kyröläinen (Supervised by Dr. Victor Kuperman)
Daniel Schmidtke (Supervised by Dr. Anna Moro)
Nicholas Welch (Supervised by Dr. Ivona Kučerová)

PHD STUDENTS

Anita Acai (Supervised by Dr. Ranil Sonnadara)
Narges Armanfard (Co-supervised by Drs. John Connolly and Jim Reilly)*
Rober Boshra (Co-supervised by Drs. John Connolly and Jim Reilly)
Cassandra Chapman (Supervised by Dr. Ivona Kučerová)
Phil Chrapka (Supervised by Dr. Jim Reilly)*
Melda Coskun (Supervised by Dr. Victor Kuperman)
Alexandra Cross (Co-supervised by Drs. Lisa Archibald and Marc Joanisse)
Tina Fahim (Supervised by Dr. Ranil Sonnadara)
Adianes Herrera (Supervised by Dr. John Connolly)
Constance Imbault (Supervised by Dr. Victor Kuperman)
Alyssa Kuciak (Supervised by Dr. Lisa Archibald)
Richard Mah (Supervised by Dr. John Connolly)
Sydney McQueen (Supervised by Dr. Ranil Sonnadara)
Emily Nichols (Supervised by Dr. Marc Joanisse)
Kelly Nisbet (Supervised by Dr. Victor Kuperman)
Nicolette Noonan (Co-supervised by Drs. Lisa Archibald and Marc Joanisse)
Anni Nora (Supervised by Dr. Elisabet Service)*
Gaisha Oralova (Supervised by Dr. John Connolly)
Laura Pauls (Supervised by Dr. Lisa Archibald)
Theresa Pham (Supervised by Dr. Lisa Archibald)
Paul Polak (Supervised by Dr. Michael Noseworthy)
Adam Politis (Supervised by Dr. Lyn Turkstra)
Fareeha Rana (Co-supervised by Drs. John Connolly and Elisabet Service)
Alex Rokos (Co-supervised by Drs. John Connolly and Stefanie Blain-Moraes)

PHD STUDENTS (CONTINUED)

Kyle Ruiter (Supervised by Dr. John Connolly)
Alejandro Santos Diaz (Supervised by Dr. Michael Noseworthy)
Edalat Shekari (Supervised by Dr. Elisabet Service)
Bryor Snefjella (Supervised by Dr. Victor Kuperman)
Narcisse Torshizi (Supervised by Dr. Elisabet Service)
Karen Tucker (Supervised by Dr. John Connolly)
Meghan Vollebregt (Supervised by Dr. Lisa Archibald)
Natalie Wagner (Supervised by Dr. Ranil Sonnadara)
Chelsea Whitwell (Supervised by Dr. Elisabet Service)
Joseph Wzaley (Supervised by Dr. Lyn Turkstra)

MASTER STUDENTS

Fateme Armanfard (Co-supervised by Drs. John Connolly and Jim Reilly)
Erin Cole (Supervised by Prof. Carol DeMatteo)
Davide Gentile (Supervised by Dr. Victor Kuperman)
Michael Greencorn (Supervised by Dr. Elisabet Service)*
Diana Harasym (Supervised by Dr. Michael Noseworthy)
Sara Jamil (Supervised by Dr. Ranil Sonnadara)
Richard Kolesar (Supervised by Dr. John Connolly)
Natalia Lapinskaya (Supervised by Dr. John Connolly)
Kenny San-Hei Luk (Co-supervised by Drs. Daniel Pape and Elisabet Service)*
Colm McCarthy (Supervised by Dr. Ranil Sonnadara)
Olivier Mercier (Supervised by Dr. Daniel Pape)
Omar Nassif (Co-supervised by Drs. Jim Reilly and Vickie Galea)
Joel Nidel (Supervised by Dr. Marc Joanisse)
Frederico Prado (Supervised by Dr. Ivona Kučerová)
Natalie Romaniuk (Supervised by Prof. Carol DeMatteo)
Nicolas Simard (Supervised by Dr. Michael Noseworthy)
Chris Steyn (Supervised by Dr. Ranil Sonnadara)
Laura VanderBeek (Supervised by Dr. Ranil Sonnadara)

** Completed program in 2017*

RESEARCH SUPPORT

MANAGER, DEVELOPMENT & RESEARCH

Chia-Yu Lin

STUDENT ASSISTANTS

Joyce Le (January – April, 2017)
Nagashree Thovinakere (January – August, 2017)
Angie Lopez (September – December, 2017)

SCIENTIFIC ADVISORY COMMITTEE

Dr. Sylvain Baillet (McGill University)
Dr. Laurie Feldman (University at Albany)
Dr. Denise Klein (McGill University)
Dr. Ken McRae (University of Western Ontario)
Dr. Lucie Ménard (Université du Québec à Montréal; UQAM)
Dr. Penny Pexman (University of Calgary)
Dr. Ken Pugh (Haskins Laboratories)
Dr. Sid Segalowitz (Brock University)
Dr. Jon Sprouse (University of Connecticut)

INTERNATIONAL COLLABORATORS

Haskins Laboratories, New Haven, Connecticut, USA

University of Turku (Department of Psychology and Speech-Language Pathology), Turku, Finland.

Words in the World (WoW), Partnership Grant funded by the Social Sciences and Humanities Research Council of Canada (SSHRC), Canada

Produced & Designed by Brie Chauncey, Chia-Yu Lin, Kiera DiLeonardo and Brittany Gottvald. Many thanks to all ARiEAL members and trainees for their contribution to this report.

ARiEAL Research Centre
L.R. Wilson Hall, room 4020
McMaster University
1280 Main St. West
Hamilton, Ontario L8S 4K1, Canada

Phone: 905-525-9140 x21032
Email: ariealrc@mcmaster.ca
Website: arieal.mcmaster.ca
Twitter: @ARiEAL_Research