

# RADIANT Summer Institute in Neurotechnology Innovation, Commercialization and Entrepreneurship



August 8–19, 2016



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# Welcome from the Director

It is my great pleasure to welcome you to the fifth annual Summer Institute in Neurotechnology Innovation, Commercialization, and Entrepreneurship (NICE) at Dalhousie University. NICE is supported by a CREATE grant from the Natural Sciences and Engineering Research Council of Canada (NSERC), and by Dalhousie University's Brain Repair Centre. Inspired by my own experiences with summer institutes in the past, NICE has been a hit with students and faculty alike, and we've used their feedback to make it even better. Learning in an intensive, 2-week format is very different from a typical class that occurs once or only a few times a week — we have designed NICE to be immersive, engaging, and inspiring. You can expect to be challenged and pushed out of your comfort zone on a regular basis over these two weeks, and I hope that you will walk away with a different and broadened perspective on commercialization and entrepreneurship. We recognize that most of the people who participate in NICE are students somewhere in the beginning or middle of a program, and are unlikely to launch a new business immediately after finishing the summer institute. However, our goal is to give you a taste of what's possible, and most importantly of the many pathways that are open to you as you look toward the future. Neuroscience and neurotechnology are poised to play an ever-increasing role in our lives and in society, and you have the potential to be part of the wave that carries this forward. Whether you contribute to this through a job in academia, by working for an existing company, or starting your own business, I hope that NICE will open doors and help you see beyond your current limits!

– Aaron Newman

## Our supporters:



# Schedule

All sessions are in the LINC classroom, 2nd floor Killam Library, except as noted.

Week	Day	9 - 10 AM	10 - 11 AM	11 AM - 12 PM	12 - 1 PM	1 - 2 PM	2 - 3 PM	3 - 4 PM	4 - 5 PM	5 - 7 PM	7 - 9 PM
1	M 8	Welcome; Overview of the program	1 min personal introduction by each student and faculty member	Overview of Biodesign process Aaron Newman	Lunch provided; Psychology lounge	Introduction to the Lean Canvas Mary Kilfoil & Ed Leach, <i>Starting Lean</i> , Dalhousie University Faculty of Management					Reception with dinner Wodden Monkey Restaurant, Dartmouth NS
	T 9	Project selection and group formation		Experiences in a Startup Chris Cowper-Smith, CEO, Spring Loaded Technologies	L u n c h	Group Project Work		Design Thinking Aaron Newman			
	W 10	Case Discussion: Apple's Core	Lean Canvas Workshop Shaun & Aaron				Intellectual Property Cecile Klein, Canadian Intellectual Property Office				
	Th 11	Case Discussion: Frank Addante	Pitching Shaun Boe	Colin Deacon, serial entrepreneur BlueLight Analytics, Inc.			Elements of a strong start-up Doug Berger, Innovate LLC				
	F 12	Entrepreneurial mindset Doug Berger, Innovate LLC					Case Discussion: Dropbox	Experiences in a Startup Ying Tam, CEO, Mindful Scientific	Dinner with practice pitches/status updates		
Sat 13											
Sun 14											
2	M 15	Case Discussion: Smartix	Forming a business and getting seed money Scott Moffitt, BioNova		L u n c h	Group Project Work	Financing your Venture Lidija Marusic, Investment Manager, Innovacorp	Case Discussion: Amazon.com			
	T 16	Case Discussion: Cipla 2011	Experiences in a Startup Juan Cruz Baldassarre, CEO, Copernicus Studios/LANGA Lab	Oral communication and presenting skills Aaron Newman			Case Discussion: Abiomed	Career Development 1 Aaron Newman			
	W 17	Case Discussion: Zynga	Career Development 2 Aaron Newman	Disruptive Innovation Jesse Rodgers			Media Training				
	Th 18	Case Discussion: Westons	Design Validation Paul Gratzler Dalhousie University				Case Discussion: Rethink what you "know" about high-achieving women	Personal sustainability Aaron Newman			
	F 19	Preparation for final project presentations					Final project presentations "Dragon's Den" Rowe Building, Room 1007			Farewell lobster boil at Aaron Newman's house	

# Campus Map



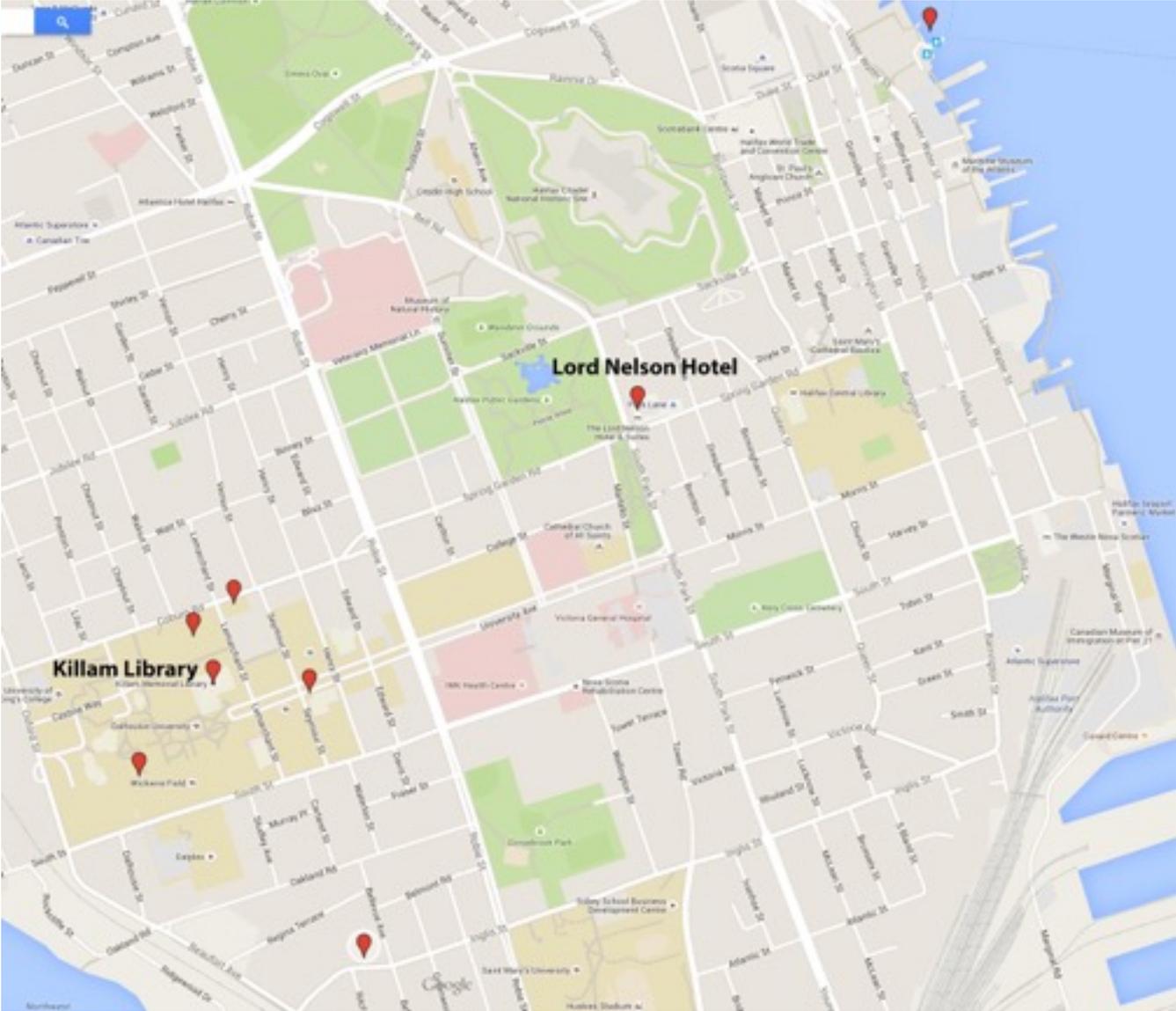
**Killam Library:** Location of most sessions (LINC, 2nd floor)

**Howe Hall:** Dorms for students staying on-campus

**Life Sciences Centre:** Location of lunch on Monday, Aug. 8

**Rowe Management Building:** Location of final “Dragon’s Den” pitch-fest, Aug. 19, 1-3 PM

# Map of Halifax Peninsula



# Contact Information

Name	Mobile	Office
<b>NICE Directors</b>		
Aaron Newman, NICE Co-Director	(902) 488-1973	(902) 494-6959
Shaun Boe, NICE Co-Director	(902) 223-8892	(902) 494-6360
<b>RADIANT Program Coordinator</b>		
Morgan Johnson	(902) 233-7465	
<b>Limo – Airport pickup/dropoff</b>		
Downeast Limo Services (Darryl McPhee)	(902) 452-8294	
<b>Local Taxi</b>		
Casino Taxi	(902) 429-6666	(902) 425-6666
<b>Hotel</b>		
Lord Nelson Hotel	(902) 423-6331	<a href="http://www.lordnelsonhotel.com">www.lordnelsonhotel.com</a>
<b>Student Dorms</b>		
Risley Hall, 1233 LeMarchant Street	(902) 494-8840	
<b>On-Campus Emergencies</b>		
Dalhousie Security Services	(902) 494-4109	Non-Emergency number: (902) 494-6400
<b>Off-Campus Emergencies</b>		
Police/Ambulance/Fire	911	
<b>Non-Emergency Health Advice</b>		
	811	
<b>Directory Assistance</b>		
	411	

# Faculty Bios



## **Aaron Newman**

*Professor, Dalhousie University*

Aaron is a cognitive neuroscientist by training, and Director of the RADIANT training program. He is involved in a number of basic and applied research projects centred around neuroplasticity. These include the development of novel applications to help people with aphasia, cochlear implant users, children with epilepsy, and adults wanting to learn a new language. He is actively involved in industrial R&D with Halifax-based companies Copernicus Studios, Mindful Scientific, and sageCrowd.



## **Shaun Boe**

*Assistant Professor, Dalhousie University*

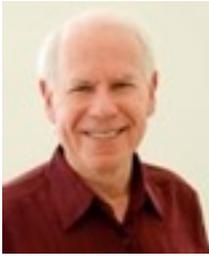
Dr. Boe provides training in basic and applied aspects of neuroscience including diagnostic and rehabilitative interventions for neurological disorders and diseases. Dr. Boe is also trained clinically as a physiotherapist and has research expertise in the areas of basic and applied neuroscience and neurorehabilitation. His research applies advanced technologies (MRI, EEG, MEG, TMS) to investigate brain function and aid functional recovery.



## **Juan Cruz Baldassarre**

*President, Copernicus Studios Inc.*

Juan Cruz grew up in Buenos Aires listening to his brothers' extensive record collection. From this grew a passion to learn English, and a lasting interest in how people learn new languages. He is currently using his more than 10 years of experience as CEO of a successful Halifax-based animation company to bring engaging, entertaining visuals, story lines, and gameplay to LANGA, a suite of video games that use speech recognition to teach people new languages. LANGA is being actively developed and tested with Dalhousie's NeuroCognitive Imaging Lab.



### **Doug Berger**

*Managing Director, Innovate, LLC*

At Innovate LLC Doug works with companies to put them onto higher growth trajectories well above their historic trend lines. This includes shifting people's mindset, creating compelling growth opportunities, and embedding new thinking into strategy, execution and leadership. Doug publishes the highly acclaimed electronic magazine, *The Innovators*. He has written numerous articles on breakthrough approaches to business, strategy & innovation, and the real-world issues of execution. He is the author of *The One Hour Breakthrough: Translating Aspiration into Action*.



### **Chris Cowper-Smith**

*CEO, Spring Loaded Technology*

Chris is currently on leave from the Ph.D. program in Psychology/ Neuroscience at Dalhousie University. Participating in the NICE Summer Institute in 2012 inspired him to take Dalhousie's Starting Lean class. This in turn led him to co-found Spring Loaded Technology, a Halifax-based medtech startup that has already raised over \$1m in capital.



### **Colin Deacon**

*CEO, BlueLight Analytics*

For the past 25 years Colin has worked as a broker, advised investment funds on sales and marketing, and helped found one of the largest life science venture funds in Canada. Colin founded SpellRead, an education company that went from a single site in Charlottetown, PEI, to being used internationally at the time of its acquisition by Kaplan Inc. After this successful exit, Colin founded BlueLight, raised its private equity funding, built sales and nurtured the company's development. BlueLight Analytics is the world leader in the provision of devices and analytics designed to enable dentists to accurately light cure their resin composite restorations.



### **JP Furey**

*CEO/CFO, BlueLight Analytics*

JP Furey is a chartered accountant. He worked for several years at KPMG Canada before joining Halifax startup BlueLight Analytics, first as COO and more recently as CFO and CEO.



### **Paul Gratzner**

*DeCell Technologies and Dalhousie University*

Dr. Paul Gratzner is Chief Scientific Officer, Founder, and Inventor of DeCell Technologies Inc. Paul is also an Associate Professor in the School of Biomedical Engineering at Dalhousie University. His research interests include the regeneration of soft tissues (e.g. skin, tendons, ligaments, heart valves, blood vessels), decellularization technologies, cell and extracellular matrix interactions, cell communication, mechanical properties of tissues, and biomedical device design.



### **Mary Kilfoil**

*Dalhousie University*

Dr. Kilfoil has more than 20 years experience as a manager in the private sector and holds the position of Senior Economist and Partner at Gardner Pinfold Consultants, one of Canada's leading firms specializing in economic analysis. She teaches in the Faculty of Management at Dalhousie University and is the Academic Lead for the Starting Lean initiative. Together with Dr. Ed Leach she is co-author of *Management*, Canada's top selling introductory textbook on the subject.



### **Cecile Klein**

*Canadian Intellectual Property Office*

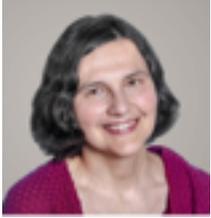
Cecile has a thorough knowledge of patents, trade-marks, copyright, industrial design and integrated circuit topography acts and related International Conventions. She is responsible for the management and development of the Intellectual property education, awareness and partnership outreach program in the Atlantic Region, as well as actively supported and delivered this program in the four Atlantic provinces



### **Ed Leach**

*Assistant Professor, Dalhousie University*

Ed teaches in the Faculty of Management at Dalhousie University and directs the Norman Newman Centre for Entrepreneurship. He has also been instrumental in designing the RADIANT curriculum. His unique ability to connect with students and uncover what motivates each one individually is attributed to his knack for balancing professorship with friendship. He encourages an open environment where students can voice their opinions, ask questions and share ideas.



### **Lidija Marusic**

*Investment Manager at Innovacorp*

Dr. Lidija Marusic is an investment manager at Innovacorp, where her focus is on identifying attractive seed and early stage investment opportunities in the life sciences sectors. Prior to joining Innovacorp, Lidija was an independent consultant providing technology assessment and business development services to the local life sciences industry. Lidija holds a Doctor of Medicine degree from the University of Zagreb in Croatia, a PhD in molecular genetics from the International School for Advanced Studies in Trieste, Italy, and an MBA from McMaster University in Hamilton, Ontario.



### **Scott Moffitt**

*Managing Director at BioNova, Nova Scotia Biotechnology & Life Sciences Industry Association*

Scott is a senior management professional with more than 18 years of life science experience in industry, government and non-profit sectors. By leveraging his leadership and management abilities, Scott has built solid relationships and delivered significant results in each position he has held. Having returned to his home province a few years ago, Scott is now focussed on making Nova Scotia a better place.



### **Ying Tam**

*CEO, Mindful Scientific*

A seasoned entrepreneur and business executive with over 20 years of industry experience, Mr. Tam has a passion for building companies, taking multiple start-up companies from initial concept to business reality. Mr. Tam has been a Director on the boards of several public, private and not-for-profit organizations. He currently sits on the board of Ogden Pond Technology Group and Fairmont Advisors. For Mindful Scientific, Mr. Tam is responsible for the overall business and financing strategies and the execution of the operational plan.

# Student Bios



## **Adeshina Adekeye**

*PhD. Student, Olabisi Onabanjo University*

Adeshina is an Anatomist by training and behavioural neuroscientist with research interest on neural system and neurodegenerative diseases. He is involved in a number of basic and applied research projects centred on drug addiction and neurotoxicity. He is a Postgraduate student of department of Anatomy and Neurobiology, Olabisi Onabanjo University, Ikenne Campus, Nigeria and work at Afe Babalola University, Anatomy department, College of Medicine and Health Sciences, Ado-Ekiti, Nigeria. He is a fellow of IBRO/ISN and a visiting researcher to Dalhousie University, Department of Neuroscience and Psychology, Halifax, Canada.



## **Lyam Bailey**

*Master's Student, Dalhousie University*

Lyam is an international student from Wales, Great Britain, where he completed his Undergraduate degree in Psychology at Bangor University. His research interests focus primarily on the utilisation of neuroimaging and neuropsychological techniques to explore language processing at the level of the brain. Now a Masters student in the Neurocognitive Imaging Lab at Dalhousie University, Lyam's current research focusses on cognitive barriers to second language acquisition adults; individual differences in the neural correlates of sentence processing; and on the potential viability of incorporating neurotechnology into treatment for aphasia.



## **Mei Lin Chen**

*MASc., University of Waterloo*

Mei Lin completed her BHSc at McMaster University and is going to pursue a MASc in Systems Design Engineering, specifically researching brain-computer interface technologies and their application in stroke rehabilitation, Parkinson's disease, and pain management. Mei Lin also coordinated clinical research in intensive care and teleophthalmology. She enjoys programming, classical singing, and weight lifting.



### **Brett Feltmate**

*Undergraduate Student, Dalhousie University*

How is it these words were chosen? How do I tell my fingers to type them? Can I move my baby toe? Apparently I can, but how did I isolate muscles I have no awareness of? I have no particular interests, only a stream of questions to be answered. I'm not searching for 'the' question. That was already asked by Alan Watts when he wrote "What I would like to see is the I that knows me when I know that I know that I know." Often the best questions are their own answer.

Principally a cognitive neuroscientist by training, specialization can be limiting; my partner says it's for insects and I tend to agree with her on most things. First volunteering in the Krigolson Neuroeconomics Lab where we looked at the role of reward in decision making; I now study visual attention under the guidance of Dr. Raymond Klein. Following my undergraduate I will be off to join Dr. Krigolson again as a masters student, potentially looking at error monitoring in the clinically anxious. Or something else, it changes on a weekly basis...



### **Adam Fraser**

*Undergraduate Student, Dalhousie University*

Adam is from Dartmouth, NS. He is finishing an undergraduate degree in Neuroscience at Dalhousie and is conducting research on cognitive control and attention. He works at a local homeless shelter dealing with those in housing needs and (drug) rehabilitative support. In his free time he enjoys music, time with friends, and the outdoors.



### **Theresa Gaughan**

*Undergraduate honours student, Dalhousie University*

Throughout her time at Dalhousie, Theresa developed an interest in memory and attention research: specifically looking at how memories influence unconscious associations. She began to become curious about the real-world applications of her research. Around the same time, she became involved in a project that investigates the use of mental imagery for stroke rehabilitation. This lead Theresa to become fascinated with the connection between the mind and body. Going into the final year of her psychology degree, Theresa hopes to pursue graduate studies that will allow her to merge these two areas of research. Doing so, she hopes to answer broader questions such as How does brain injury impact our unconscious associations? Can mindfulness training act as a rehabilitation intervention for neurological populations?



**Mohammad Habibnezhad**

*PhD. Student, Dalhousie University*

Mohammad completed his bachelor's in psychology and master's in cognitive science. He is interested in attention and working memory and how they can be enhanced or rehabilitated in normal and clinical populations, such as in persons with ADHD, stroke etc. He is also interested in EEG/ERP biomarkers of cognitive functions and cognitive deficits, and how EEG-biofeedback (or neurofeedback) can be employed to improve cognitive functions (and specifically attention).



**Hubert Hu**

*MSc. Student, University of Calgary*

Hubert (Sathaporn) is a Master's degree student in computer science at University of Calgary. His current project is to create an enhanced video player that can help people learn a foreign language in a more interactive manner. He is interested in computer science, language learning and cognitive science. He completes his Bachelor of Science at University of Calgary majoring in computer science and cognitive science.



**Andrea Kuczynski**

*PhD Candidate in Neuroscience, University of Calgary*

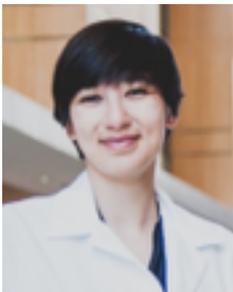
Andrea is going into her fourth and final year in her PhD Neuroscience program. She currently uses a robotic exoskeleton (KINARM) and advanced neuroimaging (diffusion tensor imaging) to investigate sensorimotor function in children with unilateral hemiparetic cerebral palsy secondary to perinatal stroke.



### **Monica Kullar**

*Research Assistant, Stanford*

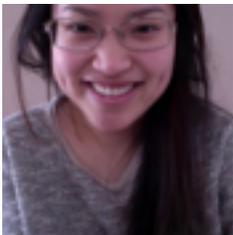
Originally born in Toronto, Monica has since lived in Illinois, California, the Netherlands, and New Zealand. She received her B.Sc. in Psychology from UCSD. After spending a year conducting research at the Stanford Social Neuroscience Lab, she became highly interested in using neuroimaging methods to answer questions ranging from the role of empathy in developing social connections, to working on developing better differential diagnoses for depression/anxiety. Monica hopes to improve our understanding of clinical disorders and integrate neurotechnology into accessible ways towards identifying and treating depression and anxiety.



### **Kit Lee**

*MSc. Student, Dalhousie University*

Kit's primary area of interest and expertise is in the research of stress and how it influences individuals on a genetic, endocrine and cognitive level. During her undergraduate degree at the University of British Columbia, Kit participated extensively in research on the relationship between prenatal exposure to teratogens, stress exposure during adolescence, and cognitive outcomes in adulthood. Currently, she works for Dr. Ian Weaver at Dalhousie University, investigating the influences of maternal stress in female mice on the cognitive ability of their offspring, and the underlying epigenetic mechanisms that may be involved. In her spare time, Kit loves cooking, rock climbing and reading science fiction novels.



### **Angela Luong**

*Undergraduate Student, Dalhousie University*

Angela is a fourth year student majoring in Neuroscience and minoring in Journalism at Dalhousie University and the University of King's College. Her previous education has inspired her to seek out different avenues that utilize neuroscience outside of a bench setting. Her studies in journalism made her interested in how neurotechnology affects day-to-day life, believing that real life is always more interesting than fiction. She hopes that the RADIANT program will give her the skillset to pursue these goals. She speaks Vietnamese and English. In her spare time, she enjoys singing, and works at a music store.



### **Colin McCormick**

*Undergraduate Honours Student, Dalhousie University*

Colin is entering the final year of his honours degree in Psychology. His main research interests are located within the domain of cognitive neuroscience, as he is fascinated with using behavioural measurements to understand neural mechanisms. Colin recently finished a project in the lab of Dr. Raymond Klein researching the qualities of inhibition of return when encoded through exogenous eye movements, and will be continuing research related to this mechanism in his honours project next year. He plans on furthering his education after completing his undergraduate degree. Colin aspires to make neurotechnology more accessible to the general public and looks forward to the skills he will obtain from the NICE program that will help him accomplish this.



### **Sarah McLeod**

*MASc student, Dalhousie University*

After obtaining a BEng in Electrical/Computer Engineering, Sarah decided she wanted to focus on medical/clinical problems. As a result, she is now entering her second year as a MASc student in Biomedical Engineering. Sarah's current research involves patient-specific processing of data obtained using MEG, an non-invasive, functional brain imaging technique. Sarah's future plans involve a PhD in Medical Physics, working with radiation therapy in a clinical setting.



### **Dano Morrison**

*MSc. Student, University of Toronto*

Raised in Seattle, Dano moved to Canada to obtain his undergraduate degree at the University of British Columbia, where he studied neuroscience and performed research on metaplasticity in the developing tadpole brain. After taking a year off to drive across the United States, Dano joined the lab of Dr. Sheena Josselyn at the University of Toronto, where he identified a novel way in which inhibition shapes the size of memory traces in the amygdala. Dano has recently become interested in developing software for the Muse EEG headset. Current projects include an app that teaches use datas about EEG by displaying personal, real-time brain data and an attention monitoring tool that efficiently allocates break time to maximize productivity.



### **Maha Naeem**

*Undergraduate Student, Dalhousie University*

Maha is entering the final year of her BSc in Neuroscience with certificates in Neurotechnology Innovation and Science Leadership and Communication. Outside the scope of her degree, Maha enjoys sketching, photography, and travelling. These pastimes have led to an increased curiosity in how we learn and adapt. With a keen passion for helping others, and a desire to discover more about the brain's plasticity, Maha's interest lies in the use of neurotechnology for rehabilitation: particularly brain to computer interfaces. After graduation, Maha intends to pursue a Master's degree.



### **Majid Nasirinejad**

*MSc., Dalhousie University*

Majid recently completed his thesis-based MSc. in Computer Science at Dalhousie University, in the GEM lab, under the supervision of Dr. Derek Reilly. He also obtained his BSc. (Hons) in Computer Science from Multimedia University in Malaysia in 2013 and received his High School Diploma in Mathematics and Physics. Majid has studied abroad, worked, and lived in many countries (Malaysia, Canada, Singapore, Hong Kong, and Iran), allowing him to learn about other cultures. Majid is interested in doing research in human-computer interaction, ubiquitous computing, and wearable technologies. He is also familiar with investigating user behavior, UX/AR/VR R&D, interaction design, wearable & mobile devices, handheld devices, creating mock-up and interactive prototypes and Internet of Things (IoT). Currently, he is working on two devices and thinking about running a campaign on Kickstarter soon.



### **Sheida Rabipour**

*PhD. Student, University of Ottawa*

Sheida holds a BSc and MSc in Neuroscience from McGill University and is currently completing her PhD in Psychology at the University of Ottawa. Her research examines the evolution of cognitive performance through interventions such as computerized cognitive training and non-invasive brain stimulation, as well as the influence of psychological factors on the effectiveness of such interventions. Aside from her academic contributions, Sheida is passionate about sharing scientific knowledge with the public. Sheida recently founded BrainBuddies Outreach, a student-led knowledge-translation club through which she and her peers engage the community in dynamic discussions about topics related to brain function and mental health.



### **Derek Rodgers**

*Undergraduate honours student, Dalhousie University*

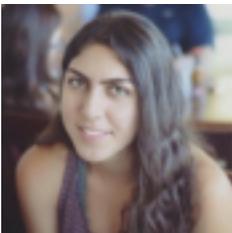
Derek is a Halifax native and fourth-year neuroscience student who has just returned from an exchange year at Maastricht University in the Netherlands. He has long had a passion for both technology and the life sciences, and is excited about combining these two passions in the field of neurotechnology. Last summer, he completed a RADIANT summer undergraduate research fellowship in the MEG lab at the IWK Health Centre in Halifax. There, he ran participants in a study investigating the effectiveness of EEG neurofeedback for motor imagery training. He also designed and developed an Android mobile app for delivering this neurofeedback in conjunction with portable, consumer-grade EEG hardware. This year, he will complete an honours project in the same laboratory. Derek has a particular interest in the applications of neurofeedback for the treatment of diverse neurological and psychiatric disorders, and is excited to contribute to the cutting edge of research in this field.



### **Shane Rajaraman**

*CRMBA Student, Dalhousie University*

Shane is a CRMBA (Corporate Residency Masters of Business Administration) student from Dalhousie University who is completing his corporate residency work term with BIOTIC (Biomedical Translational Imaging Centre) at the IWK Children's Hospital. He has experience working with medical imaging equipment, having completed an honours in PET/CT imaging in head and neck cancer. Shane holds a B.Sc. Honours Degree as well as a minor in Business from Saint Mary's University and is a Dalhousie University CRMBA 2017 candidate. He hopes to combine his business and science knowledge to improve the health care field in Canada.



### **Amneh Yacoub**

*Undergraduate student, University of California, Los Angeles*

Amneh is going into her third year at UCLA with a major in Cognitive Science and minor in Statistics. She recently switched from a Neuroscience major in order to incorporate her interests in computer science and technology into her studies. She is currently studying Parkinson's disease in the research lab of Dr. Watson. Additionally, she is active in many mental health initiatives in Los Angeles, which contribute to her interests in self-tracking. She hopes to further her studies and pursue a career involving neurotechnology.



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**Tony Zhang**

*PhD. Student, Caltech (2016)*

Tony recently graduated from McMaster's Bachelor of Health Sciences program, and will be starting his PhD at Caltech in Computation and Neural Systems this fall. In his previous research, he focused on structural neuroscience (cytoarchitecture) and electrophysiology-based modelling at Research Centre Jülich in Germany and McMaster's Neurotechnologies Lab. His current interest lies in the visual / motor systems's circuitries and translations to deep learning, as well as developing neurotechnologies that assist the study of neural circuitry and individuals with disabilities.