

2018 Biomedical Engineering Publications, Conferences and Book Chapters

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Patents

Currently under revision.

US Provisional Patent application: *Simultaneous segmentation and grading of structures for state determination*, **D. L. Collins** & Pierrick Coupé, Filed: September 16, 2011. (US 61/535,720 / P1310USPR)

Canadian Patent application: *Simultaneous segmentation and grading of structures for state determination*, **D. L. Collins** & Pierrick Coupé, Filed: September 16, 2011.

FUNNELL, W. Robert J.

Soleimani M & **Funnell WRJ** (2018) "Mechanical behaviour of short membranous liquid-filled cylinders under axial loadings." *Int J Mech Sci*, 145: 138-144.
doi: [10.1016/j.ijmecsci.2018.06.034](https://doi.org/10.1016/j.ijmecsci.2018.06.034)

Presentations/Conferences

Wang X, MacDougall D, Farrell J, Landry T, **Funnell WRJ** & Adamson R: Finite-element modelling of the human middle ear based on X-ray micro-computed tomography and Doppler optical coherence tomography in the same ear. *8th International Symposium on Middle-Ear Mechanics in Research and Otolology*. Shanghai, China, July 5-9, 2018

Soleimani M, **Funnell WRJ** & Decraemer WF: Quasi-static and dynamic modelling of the incudostapedial joint. *41st MidWinter Mtg., Assoc. Res. Otolaryngol.* San Diego, California, USA, February 10-14, 2018

HAIDAR, Ahmad

Peters, T.M., Haidar, A., (2018) "Dual-hormone artificial pancreas: benefits and limitations compared with single-hormone systems." *Diabetic Medicine*, 35 (4), 450-459.
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Abitbol, A., Rabasa-Lhoret, R., Messier, V., Legault, L., Smaoui, M., Cohen, N., Haidar, A. (2018) "Overnight Glucose Control with Dual-and Single-Hormone Artificial Pancreas in Type 1 Diabetes with Hypoglycemia Unawareness: A Randomized Controlled Trial". *Diabetes Technology & Therapeutics*, 20 (3), 189-196. doi: [10.1089/dia.2017.0353](https://doi.org/10.1089/dia.2017.0353)

Gingras, V., Desjardins, K., Smaoui, M.R., Savard, V., Messier, V., Haidar, A., Legault, L., Rabasa-Lhoret, R. (2018) "Treatment of mild-to-moderate hypoglycemia in patients with type 1 diabetes treated with insulin pump therapy: are current recommendations effective?" *Acta Diabetologica*, 55 (3), 227-231. doi: [10.1007/s00592-017-1085-8](https://doi.org/10.1007/s00592-017-1085-8)

El Fathi, A. Smaoui, M.R., Gingras, V., Boulet, B., Haidar, A. (2018) "The Artificial Pancreas and Meal Control: An Overview of Postprandial Glucose Regulation in Type 1 Diabetes". *IEEE Control Systems*, 38 (1), 67-85. doi: [10.1109/MCS.2017.2766323](https://doi.org/10.1109/MCS.2017.2766323)

Ostrovski, I., Lovblom, L.E., Scarr, D., Weisman, A., Cardinez, N., Orszag, A., Falappa, C.M., D'Aoust, E., Haidar, A., Rabasa-Lhoret, R., Legault, L., Perkins, B.A. (2018) "Analysis of Prevalence, Magnitude and Timing of the Dawn Phenomenon in Type 1 Diabetes: Descriptive Analysis of 2 Insulin Pump Trials." *Canadian Journal of Diabetes*, 44(3):229-235. doi: [10.1016/j.jcjd.2019.08.003](https://doi.org/10.1016/j.jcjd.2019.08.003)

Taleb, N., Carpentier, A.C., Messier, V., Haidar, A., Rabasa-Lhoret, R. (2018). "The Efficacy of Mono-Hormonal Artificial Pancreas System in Patients with Type 2 Diabetes on Intensive Insulin Therapy: A Randomized Cross-Over Trial". *Diabetes Care* 42(7). doi: [10.2337/dc18-2406](https://doi.org/10.2337/dc18-2406)

M Rebec, E Anderson, R Dutt-Ballerstadt, A Haidar, A Singh, A Janez, (2018) "Accuracy assessment of the Wave Form Cascade CGM system versus FreeStyle Libre over 14 days", *Diabetologia*; 61:S391.

Mihailo Rebec, Ellen M Anderson, Ralph Dutt-Ballerstadt, **Ahmad Haidar**, Andrej Janez (2018) "Accuracy Evaluation of the WaveForm Cascade CGM System vs. Dexcom G5 Sensors", *Diabetes*; 67(Supplement 1). doi: [10.2337/db18-81-LB](https://doi.org/10.2337/db18-81-LB)

Presentations/Conferences

Haidar A. "Automated insulin delivery systems in type 1 diabetes." *McGill Endocrine Retreat*, Montreal, May 31, 2018 (Invited speaker)

Haidar A. "Insulin-plus-pramlintide artificial pancreas in type 1 diabetes—randomized controlled trial". *78th American Diabetes Association Conference*. Orlando, FL, USA, June 22-26, 2018 (Oral presentation). doi: [10.2337/db18-210-OR](https://doi.org/10.2337/db18-210-OR)

Haidar A. "Can we make closed-loop systems more automated by using adjunctive therapies?" How can we close the loop?" *Annual JDRF/NIH/HCT Closed-Loop Research Meeting*. Orlando, FL, USA, June 24, 2018 (Invited speaker)

Haidar A. "Moving close to reality". *Sectoral Asset Management's 18th annual Healthcare Study Trip, Building a Biotech Hub*. Montreal, June 26-28, 2018 (Invited speaker)

Haidar A. "The artificial pancreas for type 1 diabetes", *Radiology seminar series*, RI-MUHC, 2018 (Invited speaker)

Patents

Haidar A. "Closed Loop Control of Physiological Glucose: A Bolus Algorithm for Insulin-Plus-Pramlintide Artificial Pancreas". Patent filed in 2018.

IP translated to or co-developed with industry:

- Insulin-suspension algorithm for sensor-augmented pump therapy. Eli Lilly. This IP was developed in collaboration with Eli Lilly through a development contract (engineering and clinical) between McGill and Eli Lilly. This IP is now implemented in Eli Lilly's insulin pump.
- Calibration algorithm for continuous glucose sensor. AgaMatrix. This IP was developed in collaboration with AgaMatrix through a development contract (engineering and clinical) between McGill and AgaMatrix. This IP is now implemented in AgaMatrix's sensor.
- Improvements to insulin dosing algorithm for artificial pancreas systems. Eli Lilly. This IP was developed in collaboration with Eli Lilly through a development contract (engineering and clinical) between McGill and Eli Lilly. This IP is now implemented in Eli Lilly's insulin pump.

JUNCKER, David

- J. Munzar, A. Ng, and **D. Juncker**. (2018) "Comprehensive profiling of ligand binding landscapes of duplexed aptamer families reveals widespread induced fit." *Nature Communications*. 9: 343. doi: [10.1038/s41467-017-02556-3](https://doi.org/10.1038/s41467-017-02556-3)
- A. Olanrewaju, M. Beaugrand, M. Yafia and **D. Juncker**. (2018) "Capillary microfluidics in microchannels: from microfluidic networks to capillary circuits." *Lab on a Chip*. 18: 2323-2347. doi: [10.1039/c8lc00458g](https://doi.org/10.1039/c8lc00458g)
- M. Dagher, M. Kleinman, A. Ng, and **D. Juncker**. (2018) "Ensemble Multicolour FRET Model Enables Barcoding at Extreme FRET Levels." *Nature Nanotechnology*. 13: 925-932. doi: [10.1038/s41565-018-0205-0](https://doi.org/10.1038/s41565-018-0205-0)
- P. Zimny, **D. Juncker**, and W. Reisner. (2018) "Hydrogel droplet single-cell processing: DNA purification, handling, release, and on-chip linearization." *Biomicrofluidics*. 12. doi: [10.1063/1.5020571](https://doi.org/10.1063/1.5020571)
- M. Qasaimeh, M. Pyzik, M. Astolfi, S. Vidal, **D. Juncker**. (2018) "Neutrophil Chemotaxis in Moving Gradients." *Advanced Biosystems*. 2(7): 1-12. doi: [10.1002/adbi.201700243](https://doi.org/10.1002/adbi.201700243)
- M. Dlamini, T. E. Kennedy, and **D. Juncker** "Differential Binary Haptotaxis Choice Assays of Myoblasts on Alternating Nanodot arrays of Netrin-1." *22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*. Taiwan, November 11-15, 2018
- G. Ongo and **D. Juncker**. "Multiplexed Co-Culture Patterning in 2D and 3D using Low-Cost 3D Printed Monolithic Pin-Heads." *22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*. Taiwan, November 11-15, 2018
- P. De Corwin-Martin, R. Martel, E. H. Oh, **D. Juncker**. "Nanoarray for Single Exosome-like Extracellular Vesicle Proteomics." *International Society for Extracellular Vesicles*. Barcelona, Spain, May 2-6, 2018
- Oriol Ymbern, Philippe Lenzen, Ayokunle Olanrewaju, Arya Tavakoli, Mohamed Yafia, **D. Juncker**. "Microchannel-Based Capillary Microfluidics: from Simple Networks to Capillary Circuits." *16th IEEE International NEWCAS conference*. Montreal, June 24-27, 2018
- A. Meunier, S. Kheireddine, J. Alejandro Hernández-Castro, B. Péant, D. Provencher, A.M. Mes Masson, T. Veres, **D. Juncker**. "Clusters of circulating tumor cell were selectively isolated in the blood of 12 epithelial ovarian cancer patients using facile gravity-flow-based filtration method adapted to clinical use." *109th AACR*. Chicago, USA, April 14-18, 2018
- A. Tavakoli, L. Xing, B. Ward, **D. Juncker**. "Measles Immunization Status Test Using 3D-Printed Capillary Circuits." *22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS)*. Taiwan, November 11-15, 2018

Presentations/Conferences

Juncker D. "May the Capillary Force Be with You: Empowering Bioassays, Tissue Engineering, and Diagnostic Tests". *Canadian Biomaterials Society - Montreal Student Chapter*, Montreal, Canada – February 21, 2018 (Keynote speaker)

Juncker D. "Simple" microfluidics for tough bioanalytical challenges". *NRC workshop*, Boucherville, Canada - 2018 (Keynote speaker)

Juncker D. “DNA oligos in a new light: From multicolor microparticle barcoding to master regulator of aptamer Biosensors”. *International Conference on Biomedical Applications of Nanomaterials*, Hongkong, China – January 9-12, 2018 (Keynote speaker)

Juncker D. “May the Capillary Force Be with You: Empowering Bioassays, Tissue Engineering, and Diagnostic Tests”. HongKong City University, Hong Kong, Hongkong, China – January 2018 (Invited speaker)

Juncker D. “Microchannel-Based Capillary Microfluidics: from Simple Networks to Capillary Circuits”. *16th IEEE International NEWCAS Conference*, Montreal, Canada - June 24-27, 2018 (Invited speaker)

Book Chapters

D. MacNearney, M.A. Qasamieh, and **D. Juncker.** (2018) Microfluidic Probe for Neural Organotypic Brain Tissue and Cell Perfusion. E. Delamarche and G.V. Kaigala. *Open-Space Microfluidics: Concepts, Implementations, Applications.*: 139-154. Wiley-VCH Verlag GmbH & Co., Germany.

KEARNEY, Robert E

Vadnerkar A., Figueiredo S., Mayo N.E., **Kearney R.E.** (2018) “Design and Validation of a Biofeedback Device to Improve Heel-to-Toe Gait in Seniors”. *IEEE J Biomed Health Inform* 22(1): 140-146. doi: [10.1109/JBHI.2017.2665519](https://doi.org/10.1109/JBHI.2017.2665519)

Shalish W., Kanbar L., Keszler M., Chawla S., Kovacs L., Rao S., Panaitescu B.A., Laliberte A., Precup D., Brown K., **Kearney R.E.**, Sant’Anna G.M. (2018) “Patterns of reintubation in extremely preterm infants: A longitudinal cohort study”. *Pediatric Research* 83(5):969-975. doi: [10.1038/pr.2017.330](https://doi.org/10.1038/pr.2017.330).

Robles-Rubio C.A., Brown K.A., **Kearney R.E.** (2018) “Optimal Classification of Respiratory Patterns from Manual Analyses Using Expectation-Maximization”. *IEEE J Biomed Health Inform* 22(4): 1026-1035. doi: [10.1109/JBHI.2017.2741501](https://doi.org/10.1109/JBHI.2017.2741501)

Latremouille S., et al. (2018) “Heart Rate Variability in Extremely Preterm Infants Receiving Nasal CPAP and Non-Synchronized Noninvasive Ventilation Immediately After Extubation”. *Respir Care* 63(1): 62-69. doi: [10.4187/respcare.05672](https://doi.org/10.4187/respcare.05672)

Guarin Lopez D., **Kearney R.E.** (2018) “Unbiased Estimation of Human Joint Intrinsic Mechanical Properties during Movement”. *IEEE Trans Neural Syst Rehabil Eng Epub* 26(10):1975-1984. doi: [10.1109/TNSRE.2018.2870330](https://doi.org/10.1109/TNSRE.2018.2870330)

Golkar M.A., Jalaleddini K., **Kearney R.E.** (2018) “EMG-Torque Dynamics Change with Contraction Bandwidth”. *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 26(4): 807-816. doi: [10.1109/TNSRE.2018.2805472](https://doi.org/10.1109/TNSRE.2018.2805472)

Presentations/Conferences

Vargas-Calixto C.A.J., Guarin D.L., Tehrani E.S., **Kearney R.E.** “Temporal Expansion and Parameter Varying Methods for the Identification of Nonlinear Time-Varying Ankle Dynamic

Stiffness". *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, July 17-21, 2018

Tsor G., Guarin Lopez D., Jowett N., **Kearney R.E.** "Eyelid and Blink Tracking in an Animal Model of Facial Palsy". *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, July 17-21, 2018.

Tehrani E.S., Jalaleddini K., **Kearney R.E.** "Short segment and parameter varying identification of time-varying dynamic joint stiffness". *International Conference on Neurorehabilitation*, Pisa, Italy, October 16-20, 2018

Kearney R.E., Tehrani E.S., Guarin D.L. "Temporal Expansion and Nonlinear Parameter Varying Approaches to the Identification of Time-Varying Dynamic Joint Stiffness". *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, July 17-21, 2018.

Kanbar L., Onu C.C., Shalish W., Brown K., Sant Anna G., Precup D., **Kearney R.E.** "Undersampling and Bagging of Decision Trees in the Analysis of Cardiorespiratory Behavior for the Prediction of Extubation". *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, July 17-21, 2018.

Kearney R.E. "Time-Varying Estimation of Human Neuromechanics: Modern Approaches and Their Applications". *40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Honolulu, HI, July 17-21, 2018. (invited speaker)

RUDKO, David

Milham M.P., **Rudko D.A.** et al. (2018) "An open resource for nonhuman primate imaging". *Neuron*. 100(1):61-74.e2. doi: [10.1016/j.neuron.2018.08.039](https://doi.org/10.1016/j.neuron.2018.08.039)

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M. Tabrizian 'With sugar please', *Public outreach, Cutting Edge Lecture Series*, McGill University, November 15, 2018 (Invited Speaker)

M. Tabrizian "Enabling Microfluidic Platforms for manipulating and handling bioparticles". *Ontario-on-a-chip, Microsystems for Bio'X*, Toronto, May 24-25, 2018. (Invited speaker)

S. Shoaib⁺, **M. Tabrizian** "Assessing the effects of hydrogen peroxide induced oxidative stress in MC3T3 cells using Quartz Crystal Microbalance with Dissipation", *IEEE Life Sciences Conference*, Montreal, Quebec, Canada, 28-30 October 2018

P. Modarres⁺, **M. Tabrizian** "AC Electroosmotic Mixing Using Sinusoidally Shaped Electrodes: Applications to Synthesis of Organic Nanoparticles", *IEEE Life Sciences Conference*, Montreal, Quebec, Canada, 28-30 October 2018.

J. Porter⁺, **M. Tabrizian** "Affinity Based Culture System for Human Hormone Profilings", *CFS-CREATE workshop*, Montreal (QC), Canada, September 28, 2018.

P. Modarres and **M. Tabrizian** "Frequency Hopping Dielectrophoresis as a New Approach for Cell Separation and Enrichment", *CFS-CREATE workshop*, Montreal, Canada, September 28, 2018.

M. Saad⁺, **M. Tabrizian**, S. Faucher "Generation of high-affinity aptamers binding to Legionella pneumophila", *18th International Biotechnology Symposium and exhibiyion (IBS 2018)*, Montreal, Canada, August, 12-18 2018.

M.R. Rasouli⁺, **M. Tabrizian** "Developing an Acoustic Micromixer for nanoparticle synthesis", *CFS-CREATE workshop*, Sabrevois, Canada, June 2018.

M. Yitayew⁺, **M. Tabrizian** "Molecularly imprinted microshell through layer-by-layer assembly of natural polyelectrolytes on e-coli", *Canadian Biomaterial Society*, Victoria, Canada, May 16-19, 2018.

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Tardif C. “Multi-modal MRI of myelin” *McConnell Brain Imaging Centre - Annual Scientific Retreat*, Montreal, Canada, December 2018 (Invited speaker)

Tardif C. “Quantitative magnetic resonance imaging of brain microstructure” *Molecules to Mind: Multiscale Imaging of Living Systems at McGill*, Montreal, Canada, June 2018 (Invited speaker)

Tardif C. “Magnetic resonance imaging of cortical myelin: promises and pitfalls”, *Medical Physics Unit*, McGill University Health Centre (MUHC), Montreal, Canada, May 11, 2018 (Invited speaker)

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