

# Paul E. Cisek, Ph.D.

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**Personal data:** Born in Giżycko, Poland, on Sept. 25, 1968. Moved to United States in 1977, naturalized as a **U.S. citizen** in 1981. Fluent in Polish, English, and French. Intermediate in Italian. Permanent Resident in Canada

## Research Interests

Neural mechanisms of decision-making, planning, and movement control, studied through an approach combining multi-electrode neural recordings, psychophysics, transcranial magnetic stimulation, functional neuroimaging, and computational modeling.

## Education & Research Experience

- 5/2021 – present **Full Professor**  
Département de neurosciences, Université de Montréal, Montréal, Québec
- 6/2013 – 5/2021: **Associate Professor**  
Département de neurosciences, Université de Montréal, Montréal, Québec
- 6/2010 – 5/2013: **Associate Professor (Research)**  
Département de physiologie, Université de Montréal, Montréal, Québec
- 11/2004 – 5/2010: **Assistant Professor (Research)**  
Département de physiologie, Université de Montréal, Montréal, Québec
- 7/2003 – 10/2004: **Research Associate**  
Département de physiologie, Université de Montréal, Montréal, Québec  
Studies of decision-making, planning, and movement control.
- 10/2002 – 6/2003: **Visiting Researcher**  
Laboratory of Systems Neuroscience, NIMH, Bethesda, MD  
Collaborative behavioral neurophysiological research on movement planning and control.
- 8/2001 – 9/2002: **Research Associate**  
Département de physiologie, Université de Montréal, Montréal, Québec  
Studies of decision-making, planning, and movement control.
- 6/1998 – 8/2001: **Postdoctoral Fellow**  
Supervisor: John F. Kalaska  
Département de physiologie, Université de Montréal, Montréal, Québec  
Single-unit recording from awake behaving monkeys, investigating the role of premotor and parietal cortex in response-selection, planning, and movement execution.
- 11/1996 – 5/1998: **Postdoctoral Fellow**  
Supervisor: Stephen H. Scott  
Département de physiologie, Université de Montréal, Montréal, Québec  
and Department of Anatomy and Cell Biology, Queen's University, Kingston, Ontario  
Single-unit recording from awake behaving monkeys, investigating the role of primary motor cortex in coordination of multi-joint torque production.
- 9/1992 – 9/1996: **Doctor of Philosophy, Cognitive and Neural Systems**  
Degree conferred: January 25, 1997  
Boston University, Boston, Massachusetts  
Thesis: "A neural model of voluntary reaching and postural control"  
Supervisors: Daniel Bullock, Stephen Grossberg
- 9/1987 – 11/1991: **Bachelor of Science, Computer Science – magna cum laude**  
Specializations: Physics, Psychology  
Rochester Institute of Technology, Rochester, New York

## Other Work Experience

12/1991 – 8/1992:	<b>Microsoft Corporation</b> – Redmond, WA Developed a general software controller for various electronic media ( <i>C/C++, Windows</i> )
5/1991 – 8/1991:	<b>American University</b> – Washington, DC Extended the OPS5 expert system with a Truth Maintenance System. ( <i>LISP, OPS5, Unix</i> )
6/1990 – 5/1991: 9/1991 – 11/1991:	<b>RIT Research Corporation</b> – Rochester, NY Prototyped and developed software applications including an interactive geographical database, a free-text browser, and a virtual memory manager. ( <i>Smalltalk, C, Macintosh</i> )
12/1989 – 2/1990:	<b>PPG Biomedical Corporation</b> – Pleasantville, NY Wrote machine-level background test software for a cardiopulmonary monitoring system. ( <i>Machine-level EPROM code</i> )

## Scholarships

3/2000 – 3/2001	Post-doctoral fellowship from the National Institutes of Health	US \$35,232
6/1999 – 7/1999	McDonnell-Pew Summer Institute in Cognitive Neuroscience	tuition + expenses
9/1997 – 8/1999	Post-doctoral fellowship from the National Institutes of Health	US \$44,352
9/1993 – 9/1996	CNS Graduate Scholarship (BU)	US \$48,000 + tuition
9/1992 – 8/1993	Presidential University Graduate Fellowship (BU)	US \$10,200 + tuition
9/1990 – 8/1991	DuPont Scholarship in Computer Science (RIT)	US \$1500
9/1987 – 11/1991	Empire State Scholarship of Excellence (RIT)	US \$8000

## Grants

2023	Canadian Foundation for Innovation (CFI) A virtual reality platform for controlled neurophysiological studies of interactive behavior in naturalistic environment John R. Evans Leaders Fund (PI: <b>P. Cisek</b> )	CAD \$705,964
06/2022 – 05/2028	Fonds de Recherche Québec – Nature et Technologies (FRQNT) UNIQUE (Union of Neuroscience and artificial Intelligence Quebec) Group grant (PI: K. Jerbi, co-applicants: approximately 60 members)	CAD \$3,000,000
4/2022 – 3/2027	Natural Sciences and Engineering Research Council (NSERC) Interdisciplinary studies of decision making and motor planning Discovery Grant (PI: <b>P. Cisek</b> )	CAD \$235,000
5/2021 – 4/2024	Fonds de Recherche Québec – Nature et Technologies (FRQNT) Études de la prise de décision dynamique en milieu naturel et artificiel: Une approche interdisciplinaire et intégrative Team grant (PI: <b>P. Cisek</b> , with K. Jerbi, A. Green, G. Lajoie, I. Rish, M. Puelma Touzel)	CAD \$150,000
10/2019 – 9/2024	Canadian Institutes of Health Research (CIHR) Neural mechanisms of embodied decision-making Operating grant (PI: <b>P. Cisek</b> ), rank 1/54	CAD \$1,001,160
04/2019 – 03/2022	Fonds de Recherche Québec – Nature et Technologies (FRQNT) UNIQUE (Union of Neuroscience and artificial Intelligence Quebec) Group grant (PI: K. Jerbi, co-applicants: approximately 60 members)	CAD \$600,000
4/2017 – 3/2018	Natural Sciences and Engineering Research Council (NSERC) A transcranial magnetic stimulation setup for animal research Equipment Grant (PI: N. Dancause, with <b>P. Cisek</b> , A. Green, and M. Martinez)	CAD \$147,813
4/2016 – 3/2022	Natural Sciences and Engineering Research Council (NSERC) Interdisciplinary studies of decision making and motor planning Discovery Grant (PI: <b>P. Cisek</b> )	CAD \$366,000
4/2016 – 3/2019	Natural Sciences and Engineering Research Council (NSERC) Interdisciplinary studies of decision making and motor planning Discovery Grant accelerator supplement (PI: <b>P. Cisek</b> )	CAD \$120,000
4/2016 – 3/2017	Natural Sciences and Engineering Research Council (NSERC) Infrastructure for interdisciplinary studies in embodied decisions and actions Equipment grant (PI: <b>P. Cisek</b> , with A. Green)	CAD \$149,042
10/2014 – 9/2019	Canadian Institutes of Health Research (CIHR) Neural mechanisms of real-time decisions in a constantly changing world Operating grant (PI: <b>P. Cisek</b> ), rank 1/50	CAD \$1,125,130

7/2014 – 6/2017	Fonds de la Recherche en Santé Québec (FRSQ) Chercheur national (PI: <b>P. Cisek</b> – salary support), rank 2/22	CAD \$180,000
3/2013 – 8/2016	Fonds de Recherche Nature et Technologies Québec (FQRNT) Actions triggered by everyday life stimuli: Electrophysiological explorations of the stages of a model of processing Team grant (PI: J.B. Debrulle, with <b>P. Cisek</b> , M. Brodeur)	CAD \$140,850
7/2011 – 6/2014	Fonds de la Recherche en Santé Québec (FRSQ) Chercheur boursier Senior (PI: <b>P. Cisek</b> – salary support), rank 1/25	CAD \$175,362
3/2011 – 2/2016	Natural Sciences and Engineering Research Council (NSERC) Interdisciplinary studies of decision-making and motor planning Discovery Grant (PI: <b>P. Cisek</b> )	CAD \$200,000
4/2010 – 3/2015	Canadian Institutes of Health Research (CIHR) Integration of decision-making and motor planning in premotor cortex Operating grant (PI: <b>P. Cisek</b> ), rank 2/54	CAD \$842,987
10/2009 – 9/2012	Canadian Institutes of Health Research (CIHR) Collaborative Research in Computational Neuroscience (PIs: <b>P. Cisek</b> & A. Green)	CAD \$69,222
3/2009 – 2/2010	Canadian Institutes of Health Research (CIHR / INMHA) Integration of decision-making and motor planning in premotor cortex Operating grant – bridge funding (PI: <b>P. Cisek</b> )	CAD \$64,653
1/2007 – 3/2010	The EJLB Foundation Cerebral cortical mechanisms of decision-making and action planning Scholar Research Programme (PI: <b>P. Cisek</b> )	CAD \$350,000
3/2006 – 2/2011	Natural Sciences and Engineering Research Council (NSERC) Computational studies of decision-making and planning in the primate brain Discovery Grant (PI: <b>P. Cisek</b> )	CAD \$125,000
2006	Canadian Foundation for Innovation (CFI) Neurophysiological and computational studies of voluntary action New Opportunities Fund (PI: <b>P. Cisek</b> )	CAD \$345,182
10/2005 – 9/2008	Canadian Institutes of Health Research (CIHR) Integration of decision-making and motor planning in premotor cortex Operating grant (PI: <b>P. Cisek</b> ), rank 15/41	CAD \$231,774
2005 ( <i>declined</i> )	Fonds de la Recherche en Santé Québec (FRSQ) Chercheur boursier Junior 2 (PI: <b>P. Cisek</b> – salary support), rank 14/40	(declined)
7/2005 – 6/2010	Canadian Institutes of Health Research (CIHR) New Investigator Award (PI: <b>P. Cisek</b> – salary support), rank 10/54	CAD \$250,000
6/2005	University of Montréal startup-funds (PI: <b>P. Cisek</b> )	CAD \$60,000
3/2004 – 9/2004	National Institutes of Health SBIR Phase I Grant (PI: <b>P. Cisek</b> )	US \$98,868
3/2002 – 3/2007	Canadian Institutes of Health Research (CIHR) Learning task decomposition in large-scale biological and artificial neural networks New Emerging Teams Initiative (PI: J. Kalaska, with Y. Bengio, T. Drew, S. Scott, <b>P. Cisek</b> )	CAD \$1,215,000

### **Distinctions and Awards**

Dean's List (Rochester Institute of Technology, all semesters), Outstanding Undergraduate Scholar (RIT), Phi Kappa Phi (RIT), Boston University Teaching Fellow Award, Brain Star Award, May 2005 (CIHR Institute of Neuroscience, Mental Health, and Addiction), EJLB Scholar Award 2006 (\$350,000, EJLB Foundation), Chercheur national (\$180,000 FRQS)

## **Professional Activities**

### **Society memberships:**

*Groupe de recherche sur le système nerveux central, Groupe de recherche en science de la vision, Society for Neuroscience, Neural Control of Movement Society, Canadian Association for Neuroscience, Canadian Physiological Society, American Physiological Society, Canadian Action and Perception Network*

### **Board memberships:**

Elected Board Member of the *Society for Neural Control of Movement* (2008-2010, 2011-2013 terms),  
Councilor of the *Canadian Physiological Society* (2009-2011 term)

### **Peer-review committee memberships:**

*CIHR Operating Grants Committee – Behavioral Sciences C* (Sept 2012 – 2015, Sept 2022)  
*CIHR Project Grants* (March 2016), *CIHR Foundation Grants* (2015)  
*CIHR Doctoral Research Awards Committee* (2010, 2011, 2012)  
*CIHR Masters Research Awards Committee* (2011, 2012)

### **Journal editorial boards:**

Guest editor for *Proceedings of the National Academy of Sciences* (1 paper)  
Section editor on computational modeling for the journal *Motor Control* (2007 – present)

**Ad-hoc reviewer for journals:** *Adaptive Behavior* (1), *Attention, Perception & Psychophysics* (1), *Behavioral Brain Research* (1), *Behavioral and Brain Sciences* (5), *Brain and Cognition* (1), *Brain Research* (1), *Cell Reports* (1), *Cerebral Cortex* (8), *Cognitive Neuropsychology* (1), *Current Biology* (3), *ELife* (1), *European Journal of Neuroscience* (2), *Experimental Brain Research* (4), *Frontiers in Decision Neuroscience* (2), *Frontiers in Systems Neuroscience* (1), *Journal of Cognitive Neuroscience* (3), *Journal of Consciousness Studies* (2), *Journal of Experimental Psychology* (1), *Journal of Neurogenetics* (1), *Journal of Neurophysiology* (19), *Journal of Neuroscience* (29), *Journal of Rehabilitation Research and Development* (1), *Mathematical Modelling of Natural Phenomena* (1), *Motor Control* (2), *Nature* (4), *Nature Communications* (8), *Nature Neuroscience* (11), *Nature Reviews Neuroscience* (1), *Neural Networks* (4), *Neuron* (8), *Neurocomputing* (1), *Neuroscience* (1), *Neural Computation* (1), *Philosophical Transactions of the Royal Society B* (2), *PLoS Computational Biology* (3), *Proceedings of the National Academy of Sciences* (1), *Psychological Review* (3), *Scholarpedia* (1), *Scientific Reports* (1), *Trends in Cognitive Sciences* (1), *Trends in Neurosciences* (2)

**funding agencies:** *Canadian Institutes of Health Research* (4), *DFG Germany* (1), *European Research Council* (2), *FNRS Belgium* (1), *Natural Sciences and Engineering Research Council* (2), *National Science Foundation* (3), *New York State Spinal Cord Injury Research Program* (1), *Israel Science Foundation* (1), *Israel Ministry of Science and Technology* (1), *Korean Institute for Basic Science* (1), *Swiss National Science Foundation* (1), *Wellcome Trust* (1)

**conferences and symposia:** *Advances in Computational Motor Control* (2002-2009), *Neural Control of Movement* (2009-2014), *COSYNE* (2010-2011, 2013, 2014)

### **Conference organization/Co-organization:**

***Computational Neuroscience, from theory to neurons and back again***, co-organizer of the 28<sup>th</sup> International Symposium of the GRSNC / CRSN, University of Montréal, May 8-9, 2006 (<http://www.grsnc.umontreal.ca/XXVIIIs/>)

***Theoretical Ideas in Motor Systems Neuroscience and their Capacity for Falsification***, a satellite of the 19<sup>th</sup> Annual Meeting of the Society for the Neural Control of Movement, Waikoloa, Hawaii, April 26-28, 2009.

***Physiological mechanisms of perception, cognition, and action***, the 2011 Winter Meeting of the Canadian Physiological Society / Canadian Action & Perception Network, Saint-Adèle, QC, February 10-12, 2011.

***2012 Cognitive Science Institute Summer School on The Evolution and Function of Consciousness***, Université du Québec à Montréal, June 29-July 9, 2012.

***Progress in Motor Control IX***, McGill University, Montréal, QC, July 14-16, 2013.

***The Neuroscience of Decision-Making***, co-organizer of the 38<sup>th</sup> International Symposium of the GRSNC, University of Montréal, May 2-3, 2016 (<http://www.grsnc.umontreal.ca/38s/home.html>)

**Co-organizer and panelist** of the “Brains Through Time reading club”, a semi-monthly online forum discussing evolution with Luis Puelles and invited guests: Georg Striedter (Oct 6, 2021), Maria Tosches (Dec 1, 2021), Idoia Quintana-Urzaizqui & Leonard Maler (Feb 23, 2022), Malcolm MacIver (April 27, 2022), Maria Tosches & Loreta Medina (June 15, 2022), Bruno Averbeck & Barbara Finlay (Sept 21, 2022), and Georg Striedter (November 9, 2022). Co-organized with Manuel Molano-Mazón, Raquel Garcia-Hernandez, and Alex Espinós. (<https://sites.google.com/view/bbtreadingclub/home>)

**Panelist** on Brain Behavior Quantification & Synchronizations Workshop, NIH-BRAIN initiative, March 1-2, 2022.

## Teaching experience

1. NSC-6084: **“Neurosciences computationnelles” (Computational neurosciences)**  
Département de neurosciences, Université de Montréal, Coordinators: **Paul Cisek**, Andrea Green  
Course material developed together with Drs. Andrea Green and Alain Vinet  
**22.5 hours** of lectures developed and given by Paul Cisek in Fall 2007-2010, 2012-2015, 2017, 2020-2022
2. NSC-3003: **“Perception, action, et neurocomputation” (Perception, action, and neurocomputation)**  
Département de neurosciences, Université de Montréal, Coordinators: **Paul Cisek**, John Kalaska, Andrea Green  
Course material developed together with Drs. John Kalaska and Andrea Green  
**10.5 hours** of lectures developed and given by Paul Cisek in Fall 2017-2021, **15 hours** in Fall 2022.
3. NSC-2006 **“Méthodes quantitatives en neurosciences” (Quantitative methods in neuroscience)**  
Département de neurosciences, Université de Montréal, Coordinator: Andrea Green  
Course material developed together with Drs. Andrea Green, Pierre Bellec, and Alain Vinet  
**12 hours** of lectures and labs developed by Paul Cisek each year in Spring 2015-2022
4. Lectures in the course NSC-2002: **“Neurosciences intégratives 2” (Integrative neurosciences 2)**  
Département de neurosciences, Université de Montréal, Coordinator: C. Elaine Chapman  
**6 hours** of lectures given in Fall 2014-2021
5. Lectures in the course PSL3061 **“Physiologie intégrée” (Integrated physiology)**  
Département de physiologie, Université de Montréal, Coordinator: Lucie Parent  
**3 hour** lecture and **3 hours** discussion given in Spring 2011, Fall 2011-2014
6. Lectures in the course NSC-2004 **“Travaux pratiques de neurosciences” (Neuroscience lab)**  
Département de physiologie, Université de Montréal, Coordinator: Trevor Drew  
**2 hour** lecture and **2 hour** lab given in Spring 2015-2022
7. Lecture in the course Neur603 **“Introduction to Computational Neuroscience”**  
Department of Neurology & Neurosurgery, McGill University, Coordinator: Christopher Pack  
**3 hour** lecture developed and given each year in Spring 2008-2015, 2017-2022
8. Lecture in the course NRL6070 **“Neurophysiologie fonctionnelle” (Functional neuroscience)**  
Département de physiologie, Université de Montréal, Coordinator: John Kalaska  
**3 hour** lecture developed and given each year in Spring 2006-2015, 2017-2019, 2022
9. Lecture in the course PSY2008 **“Méthodes en neurosciences cognitives 1” (Methods in cognitive neurosci)**  
Département de psychologie, Université de Montréal, Coordinator: Karim Jerbi  
**2 hour** lecture developed and given in Fall 2018-2019
10. Lecture in the course KIN6832 **“Apprentissage du mouvement humain” (Human motor learning)**  
Département de kinésiologie, Université de Montréal, Coordinator: Julie Messier  
**3 hour** lecture developed and given in Spring 2006
11. Lecture in the course CNS520 **“Principles and Methods of Cognitive and Neural Modeling II”**  
Cognitive and Neural Systems, Boston University, Coordinator: Paolo Gaudiano  
**1.5 hour** lecture developed and given in Fall 1993

## Supervisory experience

### **Graduate students**

1. Poune Mirzazadeh, student in neuroscience (M.Sc.) 09/2021 – present  
Primary supervisor  
Scholarship from UNIQUE (\$10,000)
2. Cesar Canaveral, student in neuroscience (Ph.D.) 09/2019 – present  
Primary supervisor, co-supervised with Andrea Green  
Scholarships from FRQS (\$84,000) and UNIQUE (\$15,000)
3. Thomas Lusignan, student in neuroscience (M.Sc.) FRQS and NSERC bourses 08/2018 – 12/2021  
Primary supervisor  
Scholarships from FRQS and NSERC
4. Simon Haché, student in neuroscience (M.Sc.) 09/2017 – present  
Co-supervisor, primary supervisor: Andrea Green
5. Ayuno Nakahashi, student in neuroscience (M.Sc./Ph.D.) GRSNC and FQRNT bourses 05/2013 – present  
Primary supervisor  
Scholarship from FRQNT
6. Matthew Carland, student in neuroscience (Ph.D.) 05/2015 – present  
student in neurological sciences (M.Sc.) 07/2011 – 12/2014  
Primary supervisor

7. Julien Michalski, student in neuroscience (M.Sc.) 06/2016 – 11/2020  
Primary supervisor, co-supervised with Andrea Green
8. Alexandre Pastor-Bernier, student in neurological sciences (Ph.D.) GRSNC bourse 06/2007 – 12/2012  
Primary supervisor  
Current position: **Postdoctoral fellow** at McGill University, laboratory of Alain Dagher
9. Pascal Lamblin, student in computer science (Ph.D.) 01/2005 – 03/2008  
Co-supervisor, primary supervisor: Yoshua Bengio

### Postdoctoral fellows

1. Tyler Peel, UNIQUE-IVADO Neuro-AI postdoctoral fellowship (\$140k) 04/2018 – present  
Primary supervisor
2. Bahareh Taghizadeh 11/2021 – 09/2022  
Co-supervisor, primary supervisor: Andrea Green  
Current position: Postdoctoral fellow in Universität Marburg, laboratory of Frank Bremmer
3. Timothy Meehan 10/2016 – 12/2018  
Primary supervisor  
Current position: Industry, data science
4. David Thura, FYSSSEN and GRSNC postdoctoral fellowships 07/2008 – 7/2018  
Primary supervisor  
Current position: **Principal Investigator – INSERM CRCN (tenured)**, Lyon Neuroscience Research Center, Lyon
5. Ignasi Cos Aguilera 03/2008 – 04/2012  
Primary supervisor  
Current position: **Assistant professor**, University of Barcelona, Barcelona
6. Valeriya Gritsenko 10/2008 – 12/2010  
Primary supervisor, co-supervised with J. Kalaska  
Current position: **Associate professor**, University of West Virginia
7. Thomas Michelet, FYSSSEN postdoctoral fellowship 09/2006 – 08/2008  
Primary supervisor, co-supervised with J. Kalaska  
Current position: **Team Leader**, Université Bordeaux 2
8. Jean-Philippe Thivierge, FQRNT postdoctoral fellowship 06/2006 – 09/2007  
Primary supervisor  
Current position: **Associate professor**, University of Ottawa

### Other students

1. Jakob Boulanger, undergraduate intern 01/2023 – 04/2023
2. William Lata, undergraduate intern 05–08/2022, 01–05/2023
3. Léo Demange-Hamel, undergraduate intern (NSERC bourse) 05/2021 – 08/2021
4. Ikrame Housni, visiting undergraduate student from Concordia 05/2021 – 09/2021
5. Sandra Ferland, undergraduate intern (IVADO bourse) 05/2019 – 08/2019
6. Jia Dong Wang, undergraduate intern 05/2018 – 08/2018
7. Thomas Lusignan, undergraduate intern 01/2018 – 04/2018
8. Pierre-Éric Cazeau, undergraduate intern (PREMIER and NSERC bourses) 05/2017 – 08/2017
9. Gérard Derosiere, visiting post-doc from Université Catholique de Louvain, Belgium 10/2015 – 12/2015
10. Hayeden Bye, graduate student intern (primary supervisor: A. Green) 09/2015 – 12/2016
11. Philippe Castonguay, undergraduate honors student 09/2015 – 05/2016
12. Albert Féghaly, undergraduate intern 05/2015 – 08/2015
13. Guido Guberman, visiting undergraduate intern from McGill 05/2015 – 08/2015
14. Jean-François Cabana, undergraduate intern 05/2014 – 08/2014
15. Jessica Trung, undergraduate intern (GRSNC bourse) 05–08/2012, 01–05/2013
16. Encarni Marcos, visiting graduate student from Universitat Pompeu Fabra, Barcelona 01/2012 – 04/2012
17. Elsa Tremblay, undergraduate intern (COPSE bourse) 05/2011 – 08/2011
18. Farid Medleg, visiting undergraduate intern from McGill 06/2010 – 10/2010
19. Charles-William Fradet, undergraduate intern 06/2010 – 08/2010
20. Nicolas Bélanger, undergraduate intern (GRSNC bourse) 06/2009 – 09/2009
21. Julie Beauregard-Racine, undergraduate intern (COPSE bourse) 05/2009 – 08/2009
22. Stephany El-Murr, undergraduate intern 05/2007 – 08/2007
23. Elisabeth Rounis, visiting graduate student from University College London 09/2006
24. Geneviève Aude Puskas, undergraduate intern (COPSE bourse) 05/2006 – 08/2006

### Highly qualified personnel

1. Marie-Claude Labonté, research technician 01/2006 – present

## Evaluation committees

- Doctoral theses: N Masse (McGill 2008/12/18), K Lajoie (2010/3/31), F Rivest (2010/4/14), C Chapman (University of Western Ontario 2010/11/26), J Bergstra (2011/6/7), J Belisle (2011/12/13), T Lennert (McGill 2012/4/9), J Smith (McGill 2012/5/15), C Gauthier (2012/12/05), É Coallier (2014/10/30), S Tremblay (McGill, 2015/8/7), M Leavitt (McGill, 2017/7/4), D Citherlet (2021/3/17)
- Master's theses: M Khoshnejad (2009/11/24), A Loffler (McGill 2015/5/21), A Malienko (2019/01/14), A Monnier (2019/12/12)
- Pre-doctoral exams: JE Andujar (2005/6/15), P Lamblin (2007/4/26), É Coallier (2007/9/6), A Dépeault (2008/8/20), T Addou (2009/4/9), C Gauthier (2009/8/7), A Pastor-Bernier (2009/11/24), M Khoshnejad (2011/6/21), M Leavitt (McGill 2015/4/10), L Luneau (2015/12/11), S Durocher (2016/01/11), C Montanéde (2016/7/25, 2017/5/30), M Carland (2017/07/05), A Nakahashi (2017/08/22), H Ladret (2021/11/23)
- Mentorship committees: JP Labelle (2006/7/19, 2007/7/11), T Addou (2007/7/11, 2009/10/29, 2011/8/22, 2013/8/29), A Pastor-Bernier (2008/7/21, 2009/7/20), JP Miron (2009/7/28, 2010/12/21), C Gauthier (2010/8/19, 2011/8/22), I Moreau-Debord (2012/5/7), E Lam (2012/7/20, 2013/7/18), M Khoshnejad (2013/4/15), M Carland (2013/08/27, 2016/9/29, 2019/3/22), A Loffler (McGill 2014/5/5), S Durocher (2014/6/5, 2015/7/14, 2016/4/12, 2017/5/24, 2018/6/7, 2019/6/6), L Luneau (2014/6/5, 2015/6/5, 2016/8/18, 2017/7/11), C Montanéde (2014/6/26, 2015/6/3, 2016/5/19, 2018/6/7, 2019/8/22), A Nakahashi (2015/3/17, 2016/5/26, 2017/5/23, 2018/5/31, 2019/7/18), W Yaici (2015/7/22, 2016/7/27), M Leavitt (McGill 2015/12/3, 2017/2/8), N Fortier-Lebel (2016/5/17, 2017/5/11, 2018/5/31, 2019/6/6), J Michalski (2017/5/23, 2018/6/5, 2019/8/21), J Milosz (2018/5/30), S Haché (2018/5/31, 2019/8/21), T Lusignan (2019/5/14), C Canaveral (2022/12/16), P Mirzazadeh (2023/1/12)



## Publications

(\*peer reviewed, †invited, §recommended by F1000, trainees underlined)

Total citations [<https://scholar.google.ca/citations?user=B2yaNZoAAAAJ>]: 10778 (4996 since 2018), h-index: 42;

### Peer reviewed journal articles

# citations (Google scholar)

1. \*Thura, D., Cabana, J-F., Féghaly, A., and **Cisek, P.** (2022) "Integrated neural dynamics of sensorimotor decisions and actions" *PLoS Biology*. 20(12): e3001861. <https://doi.org/10.1371/journal.pbio.3001861>. 1  
with commentary: Gail, A. (2022) "Turning decisions into actions" *PLoS Biology*. 20(12): e3001927.
2. \*Puelma-Touzel, M., **Cisek, P.** and Lajoie, G. (2022) "Performance-gated deliberation: A context-adapted strategy in which urgency is opportunity cost" *PLoS Computational Biology*. 18(5): e1010080.
3. \*Derosiere, G., Thura, D., **Cisek, P.**, and Duque, J. (2022) "Hasty sensorimotor decisions rely on an overlap of broad and selective changes in motor activity" *PLoS Biology*. 20(4): e3001598. 6
4. \***Cisek, P.** (2022) "Evolution of behavioural control from chordates to primates" *Philosophical Transactions of the Royal Society B*. 377(1844): 20200522. <https://doi.org/10.1098/rstb.2020.0522> 13
5. \*Pezzulo, G., Donnarumma, F., Ferrari-Toniolo, S., **Cisek, P.**, Battaglia-Mayer, A. (2022) "Shared population-level dynamics in monkey premotor cortex during solo action, joint action and action observation" *Progress in Neurobiology*. 210: 102214. <https://www.sciencedirect.com/science/article/pii/S0301008221002288> 2
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38. Thura, D., Trung, J., and **Cisek, P.** (2013) "A common urgency/vigor signal governs speed-accuracy trade-offs in both decision-making and movement execution" *Society for Neuroscience Abstracts* (poster)
39. Marcos, E., Cos, I., **Cisek, P.**, Girard, B., and Verschure, P.F.M.J. (2013) "Biomechanical costs of reaching movements bias perceptual decisions" *Computational Neuroscience 2013*, Paris, France, July 13-18, 2013 (poster)
40. **Cisek, P.**, and Thura, D. (2013) "Neural activity build-up during decision-making is not attributable to evidence accumulation but to a growing urge to act" *Canadian Association for Neuroscience Annual Meeting*, Toronto, ON, May 21-24, 2013 (poster)
41. Thura, D., Trung, J., and **Cisek, P.** (2013) "An urgency/vigor signal governs speed-accuracy trade-offs in both decision-making and movement execution" *Canadian Association for Neuroscience Annual Meeting*, Toronto, ON, May 21-24, 2013 (poster)



42. Carland, M., Marcos, E., Thura, D., Verschure, P.F.M.J., and **Cisek, P.** (2013) "Decision-making is influenced by a context-dependent urgency signal: model and experimental data" *Canadian Association for Neuroscience Annual Meeting*, Toronto, ON, May 21-24, 2013 (poster)
43. Thura, D., Trung, J., and **Cisek, P.** (2013) "A common urgency/vigor signal governs speed-accuracy trade-offs in both decision-making and movement execution" *23<sup>rd</sup> Annual Meeting on Neural Control of Movement*, San Juan, Puerto Rico, April 16-20, 2013 (poster)
44. Thura, D. and **Cisek, P.** (2012) "Neural bases of speed/accuracy trade-off adjustments during decision-making and movement execution in monkeys" *Society for Neuroscience Abstracts* (oral presentation)
45. Marcos, E., Carland, M., Thura, D., **Cisek, P.**, Verschure, P.F.M.J. (2012) "Decision-making depends on an urgency signal modulated by context" *Society for Neuroscience Abstracts* (poster)
46. Cos, I. and **Cisek, P.** (2012) "A study of the time-course of integration of biomechanics and visual information during motor decision-making" *8<sup>th</sup> FENS Forum*, Barcelona, Spain, July 14-18, 2012 (poster)
47. Cos, I. and **Cisek, P.** (2012) "Revealing the time-course of biomechanics and visual information during motor decision-making" *2<sup>nd</sup> Symposium on Biology of Decision-Making*, Paris, France, May 10-11, 2012 (poster)
48. Thura, D. and **Cisek, P.** (2012) "Monkey premotor and motor cortex reflect the decision process and determine the commitment to initiate a reaching movement" Oral presentation at the *22<sup>nd</sup> Annual Meeting on Neural Control of Movement*, Venice, Italy, April 22-29, 2012 (oral presentation)
49. Cos, I. and **Cisek, P.** (2012) "A study of the influence of biomechanics on decisions between reaching movements" *22<sup>nd</sup> Annual Meeting on Neural Control of Movement*, Venice, Italy, April 22-29, 2012 (poster)
50. Pastor-Bernier, A., Tremblay, E., and **Cisek, P.** (2011) "Dorsal premotor cortex is involved in switching motor plans". *Society for Neuroscience Abstracts* (poster)
51. Thura, D. and **Cisek, P.** (2011) "Neural activity during modulations of the speed-accuracy trade-off in reach decisions". *Society for Neuroscience Abstracts* (poster)
52. Thura, D. and **Cisek, P.** (2011) "Monkey frontal cortex reflects the time course of changing evidence for reach decisions". *Canadian Association for Neuroscience Annual Meeting*, Québec, May 29-June 1, 2011 (poster)
53. Cos, I., Medleg, F. and **Cisek, P.** (2011) "The influence of biomechanical anisotropies in decision-making". *Canadian Physiological Society Winter Meeting 2011*, Saint-Adèle, Québec, February 10-12, 2011 (oral presentation)
54. Thura, D., and **Cisek, P.** (2011) "Monkey frontal cortex reflects the time course of changing evidence for reach decisions". *Canadian Physiological Society Winter Meeting 2011*, Saint-Adèle, Québec, February 10-12, 2011 (oral presentation)
55. Cos, I. and **Cisek, P.** (2010) "The influence of arm biomechanics on decision-making". *Society for Neuroscience Abstracts* (poster)
56. Thura, D. and **Cisek, P.** (2010) "Monkey frontal cortex reflects the time course of changing evidence for reach decisions". *Society for Neuroscience Abstracts* (poster)
57. Pastor-Bernier, A. and **Cisek, P.** (2010) "Neural correlates of biased competition between response options in dorsal premotor cortex". *Society for Neuroscience Abstracts* (poster)
58. Cos, I., and **Cisek, P.** (2010) "The influence of biomechanics on decision-making". *7<sup>th</sup> FENS Forum of European Neuroscience*, Amsterdam, the Netherlands, July 3-7, 2010 (poster)
59. Pastor-Bernier, A. and **Cisek, P.** (2010) "Neural correlates of biased competition between response options in dorsal premotor cortex". *7<sup>th</sup> FENS Forum*, Amsterdam, the Netherlands, July 3-7, 2010 (poster)
60. \*Gritsenko, V., Kalaska, J.F., and **Cisek, P.** (2010) "The mechanism of compensation for intersegmental dynamics includes cortical control of biarticular muscles". Oral presentation at the *20<sup>th</sup> Annual Meeting on Neural Control of Movement*, Naples, FL, April 20-25, 2010 (oral presentation)
61. Pastor-Bernier, A. and **Cisek, P.** (2010) "Neural correlates of biased competition between response options in dorsal premotor cortex". *20<sup>th</sup> Annual Meeting on Neural Control of Movement*, Naples, FL, April 20-25, 2010 (poster)
62. Thura, D., **Cisek, P.** (2009) "Human perceptual decisions in noisy, changing conditions". *Society for Neuroscience Abstracts* (poster)
63. Gritsenko, V., Duncan, G., Kalaska, J.F., and **Cisek, P.** (2009) "Control of intersegmental dynamics by the primary motor cortex". *Society for Neuroscience Abstracts* (poster)
64. Nagano, A., **Cisek, P.**, Perna, A.S., Shirdel, F.Z., Leyton, M., Benkelfat, C., and Dagher, A. (2009) "Reward expectation modulates motion discrimination performance via the decision-making threshold and evidence-accumulation speed. A dopamine-depleted fMRI study". *Society for Neuroscience Abstracts* (poster)
65. Nagano, A., **Cisek, P.**, Perna, A.S., Shirdel, F.Z., Leyton, M., Benkelfat, C., and Dagher, A. (2009) "Reward expectation modulates motion discrimination performance via the decision-making threshold and evidence-accumulation speed. A dopamine-depleted fMRI study". *15<sup>th</sup> Annual Meeting of the Organization for Human Brain Mapping*, San Francisco, CA, June 18-23, 2009 (poster)
66. Cos, I. and **Cisek, P.** (2009) "Biomechanical influences on decision-making". *19<sup>th</sup> Annual Meeting on Neural Control of Movement*, Waikoloa, HI, May 1<sup>st</sup>, 2009 (poster)

67. †**Cisek, P.** (2009) "Attention and action selection through a distributed consensus", *Computational and Systems Neuroscience (COSYNE) Workshops*, Snowbird, Utah, March 3<sup>rd</sup>, 2009 (oral presentation)
68. Pastor-Bernier, A. and **Cisek, P.** (2008) "Kinematic consequences of decision-making in monkeys". *Society for Neuroscience Abstracts*, Vol. 34 (poster)
69. **Cisek, P.**, El-Murr, S. and Puskas, G. A. (2008) "Decision-making in changing conditions: Evidence against temporal integration models". *Society for Neuroscience Abstracts*, Vol. 34 (oral presentation)
70. Gritsenko, V., Duncan, G., Kalaska, J.F., and **Cisek, P.** (2008) "Primary motor cortex is involved in compensation for limb dynamics". *Transcranial Magnetic Stimulation and Neuroimaging in Cognition and Behavior*, Montréal, QC, September 25-26, 2008 (poster)
71. Pastor-Bernier, A. and **Cisek, P.** (2008) "Kinematic effects of decision-making in monkeys". *Canadian Association for Neuroscience Annual Meeting*, Montréal, QC, May 25-28, 2008 (poster)
72. Michelet, T., Théoret, H. and **Cisek, P.** (2008) "Corticospinal excitability reflects response competition during a decision-making task". *Canadian Association for Neuroscience Annual Meeting*, Montréal, QC, May 25-28, 2008 (poster)
73. El-Murr, S., Puskas, G.A., and **Cisek, P.** (2008) "Making decisions as the evidence is changing". *Canadian Association for Neuroscience Annual Meeting*, Montréal, QC, May 25-28, 2008 (poster)
74. Michelet, T., Théoret, H. and **Cisek, P.** (2008) "Corticospinal excitability reflects response competition during a decision-making task" *18<sup>th</sup> Annual Meeting on Neural Control of Movement*, Naples, FL, April 29-May 4, 2008 (poster)
75. Puskas, G.A., Thivierge, J.-P., El-Murr, S., and **Cisek, P.** (2007) "Making decisions as the evidence is changing". *Society for Neuroscience Abstracts*, Vol. 33 (poster)
76. Thivierge, J.-P. and **Cisek, P.** (2007) "Exploring the mechanisms of aperiodic synchronization: A biophysical approach". *Society for Neuroscience Abstracts*, Vol. 33 (poster)
77. †**Cisek, P.** and Puskas, G.A. (2007) "Making decisions as the evidence is changing", *Canadian Physiological Society Winter Meeting 2007*, Beaupré, Québec, January 31 – February 3, 2007 (oral presentation)
78. \***Cisek, P.** (2005) "A computational model of reach decisions in the primate cerebral cortex", *Modeling Natural Action Selection 2005 – An interdisciplinary workshop at the International Joint Conference on Artificial Intelligence*, Edinburgh, Scotland, July 30-31, 2005 (oral presentation)
79. **Cisek, P.** (2005) "Pragmatic neural representations for reach decisions: A computational model", *Program and Abstracts of the 15<sup>th</sup> Annual Meeting on Neural Control of Movement*. Key Biscayne, FL, April 14<sup>th</sup>, 2005. (poster)
80. **Cisek, P.**, Michaud, N., and Kalaska, J.F. (2004) "Integration of motor planning and sensory feedback in area 5." *Society for Neuroscience Abstracts*, Vol. 30 (poster)
81. **Cisek, P.** and Kalaska, J.F. (2004) "Specification and selection of possible reach targets in primate cerebral cortex". *Program and Abstracts of the 14<sup>th</sup> Annual Meeting on Neural Control of Movement*. Sitges, Spain, March 29<sup>th</sup>, 2004 (poster)
82. **Cisek, P.** (2003) "A model of action specification and selection in the cerebral cortex". *Society for Neuroscience Abstracts*, Vol. 29 (poster)
83. \***Cisek, P.** (2003) "A computational model of reach decisions in the primate cerebral cortex". *Advances in Computational Motor Control II*, a Satellite Symposium of the 33<sup>rd</sup> Annual Meeting of the Society for Neuroscience. New Orleans, LA, November 7<sup>th</sup>, 2003 (oral presentation)
84. **Cisek, P.** & Kalaska, J.F. (2002) "Neural activity in dorsal premotor cortex (PMd) during observation of instructed-delay tasks" *Society for Neuroscience Abstracts*, Vol. 28 (poster)
85. \***Cisek, P.** (2002) "Think before you act, but prepare an assortment of partial actions before you think". *Advances in Computational Motor Control*, a Satellite Symposium of the 32<sup>nd</sup> Annual Meeting of the Society for Neuroscience. Orlando, FL, November 2<sup>nd</sup>, 2002 (oral presentation)
86. **Cisek, P.** & Kalaska, J.F. (2001) "Activity in dorsal premotor cortex (PMd) reflects anticipation of the likely response choice during a selection task". *Society for Neuroscience Abstracts*, Vol. 27 (poster)
87. **Cisek, P.** and Kalaska, J.F. (2000) "Modest gaze-related discharge modulation in primate dorsal premotor cortex (PMd) during a response-selection task without controlled gaze fixation". *Society for Neuroscience Abstracts*, 26(1):957 (poster)
88. Kalaska, J.F., **Cisek, P.**, and Crammond, D.J. (2000) "Effector-independent activity in primate dorsal premotor cortex (PMd) during instructed-delay tasks". *Society for Neuroscience Abstracts*, 26(1):957 (poster)
89. \***Cisek, P.** (2000) "The 'Two Action Systems' model of behavior". *The 26<sup>th</sup> annual meeting of the Society for Philosophy and Psychology*, Columbia University, June 17<sup>th</sup>, 2000 (oral presentation)
90. **Cisek, P.** and Kalaska, J.F. (1999) "Neural correlates of multiple potential motor actions in primate premotor cortex". *Society for Neuroscience Abstracts*, 25(1):381 (poster)
91. **Cisek, P.** and Scott, S.H. (1998) "Cooperative action of mono- and bi-articular arm muscles during multi-joint posture and movement tasks in monkeys". *Society for Neuroscience Abstracts*, 24(1):420 (poster)
92. Scott, S.H. and **Cisek, P.** (1998) "The use of KINARM to quantify and manipulate the mechanics of multi-joint arm movements of monkeys". *Society for Neuroscience Abstracts*, 24(1):420 (poster)

93. Scott, S.H. and **Cisek, P.** (1997) "Population vector rotation without mental rotation". *Society for Neuroscience Abstracts*, 23(2):274 (poster)
94. **Cisek, P.**, Grossberg, S. and Bullock, D. (1997) "A cortico-spinal model of reaching and proprioception under multiple task constraints". *Society for Neuroscience Abstracts*, 23(2):369 (poster)
95. **Cisek, P.**, Bullock, D., and Grossberg, S. (1996) "Cortical circuits for control of voluntary arm movements". *Program and Abstracts of the 6<sup>th</sup> Annual Meeting on Neural Control of Movement Vol 1*, CI-1 p. 30 (poster)
96. **Cisek, P.**, Bullock, D., and Grossberg, S. (1995) "Cortical networks for control of voluntary arm movements under variable force conditions". *Society for Neuroscience Abstracts*, 21:269 (poster)
97. Chey, J., **Cisek, P.**, Gaudiano, P., and Wood, R. (1994) "Are learned biases in *Aplysia* headwaving due to associative or non-associative mechanisms?" *Society for Neuroscience Abstracts*, 20:1073 (oral presentation)
98. Bullock, D., **Cisek, P.**, and Grossberg, S. (1994) "A neural model of voluntary movement and proprioception". *Society for Neuroscience Abstracts*, 20:1405 (poster)
99. **Cisek, P.** and Gray, M. (1992). "Extending the Reasoning Ability of Expert Systems". *Proceedings of the Sixth National Conference on Undergraduate Research Vol II*:762-767 (oral presentation)

## **Invited talks & seminars**

1. "The evolution of cognition from embodied interaction" Minds in Movement workshop, Center for Mind, Brain, and Culture, Emory University, **Atlanta, GA**, May 15-17, 2023 (invited talk)
2. "Neural mechanisms of interactive behavior" Action Club Seminar, Northeastern University, **Boston, MA**, May 4, 2023 (seminar)
3. "The neural mechanisms of dynamic decisions", Spring Seminar Series in Theoretical Neuroscience, University of Barcelona, **Barcelona, Spain**, April 25, 2023 (seminar, virtual)
4. "The neural control of movement through the lens of evolution", Workshop organized (by P. Cisek & T. Sanger) at the 32<sup>nd</sup> Annual Meeting on Neural Control of Movement, **Victoria, BC**, April 19<sup>th</sup>, 2023. Speakers: T. Sanger, A. Kardamakis, L. Krubitzer, and P. Cisek (invited talk)
5. "Rethinking behavior in the light of evolution", Seminar in Cognitive Informatics, Université du Québec à Montréal, **Montréal, QC**, March 30, 2023 (seminar, virtual)
6. "Neural mechanisms of real-time decisions", McLean Conte Center, Harvard Medical School, **Belmont, MA**, March 27, 2023 (seminar, virtual)
7. "Rethinking behavior in the light of evolution", Cognitive Science seminar series, Lund University, **Lund, Sweden**, March 21, 2023 (seminar, virtual)
8. "Making decisions in a world full of action" Meet-the-Expert, Society for Neuroscience, **San Diego, CA**, November 12, 2022 (invited talk)
9. "Rethinking behavior in the light of evolution", Psychology seminar series, Bilkent University, **Ankara, Turkey**, October 26, 2022 (seminar, virtual)
10. "Evolution of decision systems", Primate Cognitive Neuroscience Summer School, German Primate Center, **Bad Bevensen, Germany**, August 2, 2022 (invited talk)
11. "Neural mechanisms of embodied decisions", Nencki School of Ideas in Neuroscience, Nencki Institute of Experimental Biology, **Warsaw, Poland**, July 7, 2022 (invited talk)
12. "Two histories of brain function", Nencki School of Ideas in Neuroscience, Nencki Institute of Experimental Biology, **Warsaw, Poland**, July 6, 2022 (invited talk)
13. "The neural mechanisms of real-time decisions", Distinguished Seminar Series, the Allen Institute, **Seattle, WA**, June 8, 2022 (seminar, virtual)
14. "Carving up the brain at its phylogenetic joints", Systems neuroscience through the lens of evolutionary theory, online workshop (co-organized), University of Barcelona, **Barcelona, Spain**, May 16, 2022. Speakers: L.F. Barrett, L. Pessoa, B. Finlay, J. LeDoux, P. Cisek, P.S. Churchland (talk, virtual)
15. "The neural mechanisms of real-time decisions", Rotman Research Institute Academic Rounds, University of Toronto, **Toronto, ON**, May 16, 2022 (seminar, virtual)
16. "Neural dynamics of embodied decisions", Neural Dynamics Forum, University of Bristol, **Bristol, United Kingdom**, May 6, 2022 (seminar, virtual)
17. "Rethinking behavior in the light of evolution", Neuroscience seminar series, SUNY Downstate, **Brooklyn, NY**, April 20, 2022 (seminar, virtual)
18. "Rethinking behavior in the light of evolution" Cognitive Science Colloquium, École Normale Supérieure, **Paris, France**, April 5, 2022 (seminar)
19. "What can the history of real organisms tell us about synthetic ones?" Alt-AI: End Robotics, Begin Synthetic Organisms, workshop at the International Conference on Soft Robotics, **Edinburgh, Scotland**, April 4, 2022 (invited talk, virtual)
20. "The neural mechanisms of real-time decisions" Brain in Action seminar series, York University, **Toronto, ON**, February 15, 2022 (seminar, virtual)
21. "Rethinking behavior in the light of evolution", Department of Neuroscience, University of Geneva, **Geneva, Switzerland**, January 17, 2022 (seminar, virtual)



22. "The neural mechanisms of real-time decisions" CERVO Research Centre, University of Laval, **Québec, QC**, November 5, 2021 (seminar)
23. "Carving up behavior in the light of evolution", FENS-Kavli Network of Excellence Annual Meeting, IST Austria, **Vienna, Austria**, October 20-22, 2021 (keynote talk)
24. "The long evolutionary history of the brain's functional architecture", Preprogrammed: Innateness in Neuroscience and AI, Nencki Institute, **Warsaw, Poland**, September 9, 2021 (invited talk, virtual)
25. "Evolution of the human brain, long before humans" Evolving Neural Networks, online workshop, University of Barcelona, **Barcelona, Spain**, June 17, 2021 (invited talk, virtual)
26. "Neuroscience of decision-making" UNIQUE Student Symposium, University of Montréal, **Montréal, QC**, June 7-8, 2021 (seminar, virtual)
27. "Rethinking behavior in the light of evolution" Research Colloquium in Cognitive Neuroscience, University of Regensburg, **Regensburg, Germany**, May 7, 2021 (seminar, virtual)
28. "Rethinking behavior in the light of evolution" Ghent University, **Ghent, Belgium**, March 11, 2021 (seminar, virtual)
29. "The neural control of decision urgency and movement vigor" Virtual online workshop on the "Terra Incognita: diving into the deep brain", University of Amsterdam, **Amsterdam, The Netherlands**, March 1-3, 2021 (invited talk, virtual)
30. "The neural control of decision urgency, movement vigor, and reward rate maximization", Quantitative Psychology Brownbag series, University of Illinois, **Urbana-Champaign, IL**, February 10, 2021 (seminar, virtual)
31. "Rethinking behavior in the light of evolution" Barcelona Computational, Cognitive, and Systems Neuroscience Community seminar, **Barcelona, Spain**, January 20, 2021 (seminar, virtual)
32. "The neural mechanisms of real-time decisions" Centre for Neuroscience Studies, Queen's University, **Kingston, ON**, January 13, 2021 (seminar, virtual)
33. "Rethinking behavior in the light of evolution" Cos Lab seminar, University of Barcelona, **Barcelona, Spain**, December 10, 2020 (seminar and discussion, virtual)
34. "Introduction to decision-making models" Montreal Artificial Intelligence and Neuroscience meeting (<https://www.youtube.com/watch?v=qvLpFnIm39M>), **Montréal, QC**, December 3, 2020 (invited tutorial, virtual)
35. "Deciding while acting" Theoretical and Cognitive Neuroscience lab, Pompeu Fabra University, **Barcelona, Spain**, November 26, 2020 (seminar, virtual)
36. "The neural control of decision urgency and movement vigor" Action Club Speaker Series, Department of Kinesiology, Penn State University, **University Park, PA**, November 6, 2020 (seminar, virtual)
37. "Rethinking behavior in the light of evolution", National Institutes of Health, **Bethesda, MD**, October 30, 2020 (seminar and discussion, virtual)
38. "Rethinking behavior in the light of evolution" Cognitive Psychology departmental seminar, Vrije Universiteit Amsterdam, **Amsterdam, The Netherlands**, October 23, 2020 (seminar, virtual)
39. "Two approaches to refining the taxonomy of cognitive neuroscience" with M. Anderson, Seminar Series: Problem of Cognitive Ontology (<https://www.centerphilsci.pitt.edu/cogont/>), **Pittsburgh, PA**, October 12, 2020 (invited talk, virtual)
40. "Rethinking behavior in the light of evolution" The Learning Salon (<https://www.learningsalon.ai/>), October 9, 2020 (seminar and discussion, virtual)
41. "Rethinking behavior in the light of evolution" Hayden Lab seminar, University of Minnesota, **Minneapolis, MN**, September 21, 2020 (seminar and discussion, virtual)
42. "Rethinking behavior in the light of evolution" Gatsby Computational Neuroscience Unit, University College London, **London, United Kingdom**, July 15, 2020 (seminar, virtual)
43. "Carving up brain functions from an evolutionary perspective" Organization for Human Brain Mapping, **Montréal, QC**, June 26, 2020 (invited talk, virtual)
44. "Rethinking behavior from an evolutionary perspective" Neurosymposium (<https://en.neurosymposium.ca>), **Montréal, QC**, June 18, 2020 (keynote talk, virtual)
45. "Are normative models a good framework for systems neuroscience?" debate with B. Richards. Neuromatch (<https://neuromatch.io/>), March 30-31, 2020 (invited talk, virtual)
46. "Rethinking primate behavior in the light of evolution" Janelia Research Campus, **Ashburn, VA**, January 28, 2020 (seminar)
47. "Rethinking behavior from an evolutionary perspective" Interdisciplinary Conference on Psychology, Neuroscience, and Philosophy, University of Montréal, **Montréal, QC**, November 7, 2019 (keynote talk)
48. "Neural mechanisms of real-time decisions" Neurology Grand Rounds, Montreal Neurological Institute, **Montréal, QC**, September 25, 2019 (seminar)
49. "Rethinking behavior from an evolutionary perspective" Montreal Institute for Learning Algorithms, **Montréal, QC**, July 19, 2019 (invited talk)
50. "A natural history of affordances" 2<sup>nd</sup> International Workshop of Computational Models of Affordance in Robotics, International Conference of Robotics and Automation, **Montréal, QC**, May 24, 2019 (invited talk)
51. "The neural control of urgency and vigor for maximizing reward rate", Optimal Neuroethology of Movement and Motor Control, Banff International Research Station, **Banff, AB**, May 19-24, 2019 (invited talk)

52. "The neural dynamics of real-time decision-making" EMBO / EMBL Symposium, **Heidelberg, Germany**, April 10-13, 2019 (invited talk)
53. "The neural mechanisms of embodied decisions" 2018 Tübingen Systems Neuroscience Symposium, **Tübingen, Germany**, October 18-19, 2018 (invited talk)
54. "The evolutionary history of integrated cognition and action", Workshop on Cognition and Action, Psychonomics Society Annual Meeting, **Amsterdam, the Netherlands**, May 7-9, 2018 (keynote talk)
55. "The neural mechanisms of real-time decisions", Cognitive, Linguistic, & Psychological Sciences seminar series, Brown University, **Providence, RI**, April 4, 2018 (seminar)
56. "Embodied decision systems", Brain-to-Society Decision and Behavior Research Workshop, McGill University, **Montréal, QC**, February 19-20, 2018 (invited talk)
57. "The challenges and mechanisms of embodied cognition", NeuroQAM, Université du Québec à Montréal, **Montréal, QC**, January 26, 2018 (seminar)
58. "The neural mechanisms of real-time decisions", Neuroscience program, University of Colorado, **Aurora, CO**, January 16, 2018 (seminar)
59. "The bumpy road to strong AI", Montréal Artificial Intelligence & Neuroscience meeting, **Montréal, QC**, November 18-19, 2017 (invited talk)
60. "Neural mechanisms of action selection", Advances in Motor Learning and Motor Control, a Satellite Symposium of the Annual Meeting of the Society for Neuroscience, **Washington DC**, November 11, 2017 (keynote talk)
61. "Beyond neuroeconomics: The challenges and mechanisms of embodied decisions" Department of Marketing, McGill University, **Montréal, QC**, November 1, 2017 (seminar)
62. "Evidence, urgency, and decision-making in a changing world", Department of Psychology, Princeton University, **Princeton, NJ**, October 27, 2017 (seminar)
63. "The neural mechanisms of real-time decisions", Inaugural lecture of the Systems, Cognitive and Computational Neuroscience series, Columbia University, **New York, NY**, October 17, 2017 (seminar)
64. "The neural dynamics of dynamic decisions in corticostriatal circuits", 7<sup>th</sup> International Symposium on the Biology of Decision-Making, **Bordeaux, France**, May 14-16, 2017 (invited talk)
65. "Neural mechanisms of real-time embodied decisions", Symposium at the Cognitive Neuroscience Society Meeting, **San Francisco, CA**, March 25-28, 2017 (invited talk)
66. "Evidence, urgency, and decision-making in a changing world", University of Houston, **Houston, TX**, March 24, 2017 (seminar)
67. "Neural mechanisms of embodied action", Motorik 2017, **Augsburg, Germany**, March 8-10, 2017 (keynote talk)
68. "The challenges and mechanisms of embodied decisions", Washington University, **St. Louis, MO**, December 14, 2016 (seminar)
69. "The neural dynamics of real-time decisions", Center for Studies in Behavioural Neurobiology, Concordia University, **Montréal, QC**, November 3<sup>rd</sup>, 2016 (seminar)
70. "The neural dynamics of real-time decisions", Janelia Research Campus, **Ashburn, VA**, August 3, 2016 (seminar)
71. "Beyond economics: The challenges and mechanisms of embodied decisions", Neuroeconomics Seminar series, University of Zurich, **Zurich, Switzerland**, May 12, 2016 (seminar)
72. "Leaky integration with collapsing bounds: The urgency-gating model", Basel Workshop on Sequential Sampling Models, **Emmetten, Switzerland**, May 10, 2016 (invited talk)
73. "The challenges and mechanisms of embodied decisions", Brain-to-Society (BtS) Translational research workshop, McGill University, **Montréal, QC**, May 4, 2016 (invited talk)
74. "The challenges and mechanisms of embodied decisions", *The Neuroscience of Decision-Making*, 38<sup>th</sup> International Symposium of the GRSNC, University of Montréal, **Montréal, QC**, May 3, 2016 (invited talk)
75. "The basal ganglia influence commitment to a choice, but not the choice itself", Oral presentation at the 26<sup>th</sup> Annual Meeting on Neural Control of Movement, **Montego Bay, Jamaica**, April 25, 2016 (invited talk)
76. "Reconsidering the foundations of cognitive science", Le Cercle de Recherche de l'Institut des Sciences Cognitives, Université du Québec à Montréal, **Montréal, QC**, March 17, 2016 (seminar)
77. "Neural mechanisms for interacting with a world full of action", CÉAMS, Hôpital du Sacré-Coeur de Montréal, **Montréal, QC**, February 22, 2016 (seminar)
78. "Inferring the dynamics of decision-making", 2015 Canadian Mathematical Society Winter Meeting, **Montréal, QC**, December 6, 2015 (invited talk)
79. "The neural dynamics of dynamic decisions", University of Waterloo, **Waterloo, ON**, November 20, 2015 (seminar)
80. "Making decisions in a dynamic world", Distinguished Speakers in Behavioral and Brain Sciences, Cornell University, **Ithaca, NY**, November 6, 2015 (seminar)
81. "Neural mechanisms for interacting with a world full of action", Cornell University, **Ithaca, NY**, November 5, 2015 (seminar)
82. "Neural mechanisms of real-time decisions", NIH Neuroscience Seminar Series, **Bethesda, MD**, May 18, 2015 (seminar)
83. "Neural mechanisms of real-time decisions", University of Rochester, **Rochester, NY**, April 29, 2015 (seminar)
84. "Neural mechanisms of real-time decisions", Northwestern University, **Chicago, IL**, March 27, 2015 (seminar)

85. "Integrated studies of embodied decisions and actions", University College London, **London, United Kingdom**, December 2, 2014 (invited talk)
86. "Neural mechanisms for making decisions in a dynamic world", 2<sup>nd</sup> I.N.T. Neuroscience conference, **Marseille, France**, Oct 2-3, 2014 (invited talk)
87. "Neural mechanisms for making decisions in a dynamic world", 10<sup>th</sup> Conference of the Bernstein Network for Computational Neuroscience, **Göttingen, Germany**, September 2-6, 2014 (invited talk)
88. "Feedback models of reaching", Summer School in Computational Sensory-Motor Neuroscience, University of Minnesota, **Minneapolis, MN**, August 3-17, 2014 (invited talk)
89. "Neural mechanisms for making decisions in a dynamic world", McGill University, **Montréal, Québec**, April 30, 2014 (seminar)
90. "Neural mechanisms of interactive behaviour", University of Utah, **Salt Lake City, UT**, April 7-9, 2014 (seminar)
91. "Who makes the decision?", Groupe d'étude interdisciplinaire sur la nature humaine, Université de Montréal, **Montréal, Québec**, April 1-2, 2014 (invited talk)
92. "Inferring the mechanisms of decisions" Quantifying Structure in Large Neural Datasets, Grossman Center for the Statistics of Mind, Columbia University, **New York, NY**, October 16-18, 2013 (invited talk)
93. "An integrated neural mechanism of speed/accuracy tradeoffs in decision-making and action execution" Progress in Motor Control IX, McGill University, **Montréal, Québec**, July 14-16, 2013 (invited talk)
94. "On the challenges and mechanisms of embodied decision-making" Perceptual Expertise Network XXVI Workshop, Carnegie-Mellon University, **Pittsburgh, PA**, April 12-13, 2013 (invited talk)
95. "Integrated neural mechanisms of decision-making and action planning" 2013 NECOTIS workshop, University of Montréal, **Montréal, Québec**, March 1, 2013 (invited talk)
96. "Moving beyond the computer metaphor for the brain" Canadian University Software Engineering Conference, **Montréal, Québec**, January 17-19, 2013 (invited talk)
97. "The vanishing central executive: Distributed neural mechanisms for decision-making", Summer Institute in Cognitive Science, Université du Québec à Montréal, **Montréal, Québec**, June 30-July 9, 2012 (invited talk)
98. "Neural mechanisms for committing to a decision about action". University College London, **London, United Kingdom**, May 2<sup>nd</sup>, 2012 (seminar)
99. "Neural mechanisms for committing to a decision about action". Johns Hopkins University, **Baltimore, MD**, February 6, 2012 (seminar)
100. "Neural mechanisms for committing to a decision about action". University of West Virginia, **Morgantown, WV**, January 18, 2012 (seminar)
101. "Neural mechanisms for committing to a decision about action". University of Minnesota, **Minneapolis, MN**, December 9, 2011 (seminar)
102. "Computational mechanisms of decision-making". 2011 Summer School in Computational Sensory-Motor Neuroscience, Queen's University, **Kingston, Ontario**, August 7-21, 2011 (invited talk)
103. "Committing to a choice: Neural correlates of action selection in the premotor cortex". Workshop of the Center for Studies in Behavioral Neurobiology, Concordia University, **Montréal, Québec**, April 7-8, 2011. (invited talk)
104. "Neural dynamics of action competition in premotor cortex". Annual Meeting of the Physiological Society of Japan, **Yokohama, Japan**, March 28-30, 2011. (invited talk, *cancelled due to earthquake*)
105. "Neural mechanisms for committing to a decision about action". NSF-IGERT Special Symposium on Motor Control, **Stanford, CA**, March 2, 2011. (invited talk)
106. "Biased competition between actions in dorsal premotor cortex". Tohoku International Symposium on Multidisciplinary Neuroscience, **Sendai, Japan**, January 22-23, 2011. (invited talk)
107. "Neural mechanisms of sensorimotor decisions in the cerebral cortex". Centre for Brain and Mind, University of Western Ontario, **London, Ontario**, November 26, 2010. (seminar)
108. "Neural mechanisms of sensorimotor decisions in the cerebral cortex". Centre for Vision Research, York University, **Toronto, Ontario**, October 22, 2010. (seminar)
109. "Integrated neural processes of decision-making and sensorimotor planning". Cognitive and Physical Models of Speech Production, Speech Perception and Production-Perception Interaction, **Berlin, Germany**, Sept 27-October 1, 2010. (invited talk)
110. "Decision-making at early stages of action preparation". Oral presentation at the 7<sup>th</sup> FENS Forum of European Neuroscience, **Amsterdam, the Netherlands**, July 6, 2010. (invited talk)
111. "Integrated neural processes of decision-making and sensorimotor planning", Seventh Motor Control Summer School, **Wisia, Poland**, June 24-28, 2010. (invited talk)
112. "Decisions in changing conditions: The urgency-gating model". Bordeaux Workshop on Decision Making, **Bordeaux, France**, June 9-10, 2009. (invited talk)
113. "The blurry borders between deciding and doing". Jerusalem Motor Days, **Jerusalem, Israel**, June 7<sup>th</sup>, 2009. (invited talk)
114. "The blurry borders between deciding and doing", The 13<sup>th</sup> International Conference on Cognitive and Neural Systems, Boston University, **Boston, MA**, May 27-30, 2009. (invited talk)

115. "Action selection and the motor system". Oral presentation at the *19<sup>th</sup> Annual Meeting on Neural Control of Movement*, **Waikoloa, HI**, April 29<sup>th</sup>, 2009. (invited talk)
116. "Reaching decisions through a distributed consensus", CNRS, Université Victor Segalen-Bordeaux 2, **Bordeaux, France**, March 30<sup>th</sup>, 2009. (seminar)
117. "Deciding about actions: The affordance competition hypothesis", School of Physical and Occupational Therapy, McGill University, **Montréal, Québec**, March 10<sup>th</sup>, 2009. (seminar)
118. "Changing evidence about decision models", *Canadian Physiological Society Winter Meeting 2009*, **Mont-Sainte-Anne, Québec**, February 5, 2009. (invited talk)
119. "Reaching decisions through a distributed consensus", Workshop on Open Problems in the Neuroscience of Decision Making, OIST Seaside House, **Okinawa, Japan**, October 16-18, 2008. (invited talk)
120. "Making decisions as the evidence is changing", Okinawa Institute of Science and Technology, **Okinawa, Japan**, October 14, 2008. (seminar)
121. "Cognition through sensorimotor competition", Barcelona Cognition, Brain and Technology Summer School, **Barcelona, Spain**, Sept 8-22, 2008. (invited talk)
122. "The blurry borders between deciding and doing", Fifth Motor Control Summer School, Camp Maromac, **Val Des Lacs, Québec**, July 11-15, 2008. (invited talk)
123. "Deciding about actions: The affordance competition hypothesis", Department of physiology, Queen's University, **Kingston, Ontario**, March 31<sup>st</sup>, 2008. (seminar)
124. "Deciding about actions: The affordance competition hypothesis", Neuroscience Institute, Stanford University, **Stanford, CA**, March 20<sup>th</sup>, 2008. (seminar)
125. "Deciding about actions: The affordance competition hypothesis", Smith-Kettlewell Eye Research Institute, **San Francisco, CA**, March 19<sup>th</sup>, 2008. (seminar)
126. "Cerebral cortical mechanisms of decision-making and action planning", *The EJLB Foundation Scholars Symposium*, **North Hatley, Québec**, October 12-14, 2007. (invited talk)
127. "Some old and some new ideas in neuroscience", *St. Paul's Lodge*, **Montréal, Québec**, October 9, 2007. (lecture to lay audience)
128. "Cortical mechanisms of reach decisions", *First Annual Meeting of the Canadian Association of Neuroscience*, **Toronto, Ontario**, May 23-25, 2007. (invited talk)
129. "Computational and neurophysiological studies of simple decisions", *Frontiers of Theoretical Neuroscience Workshop*, University of Waterloo, **Waterloo, Ontario**, April 13, 2007. (invited talk)
130. "Deciding about actions". Oral presentation at the *17<sup>th</sup> Annual Meeting on Neural Control of Movement*, **Seville, Spain**, March 30<sup>th</sup>, 2007. (invited talk)
131. "Deciding about actions: The affordance competition hypothesis", Bernstein Center for Computational Neuroscience, **Göttingen, Germany**, March 23, 2007. (seminar)
132. "Deciding about actions: The affordance competition hypothesis", Institute of Movement Neuroscience, University College London, **London, United Kingdom**, March 21, 2007. (seminar)
133. "Cortical dynamics of action specification and selection", *The 10<sup>th</sup> Tamagawa-Riken Dynamic Brain Forum – DBF'07*, **Hakuba, Japan**, March 5-9, 2007. (invited talk)
134. "Cognitive processes in the primate premotor cortex", École d'Optométrie, Université de Montréal, **Montréal, Québec**, November 27<sup>th</sup>, 2006. (seminar)
135. "La planification et la prise de décision dans le cortex cerebral", *2<sup>nd</sup> Annual GRSNC retreat*, Far Hills Inn, **Val-Morin, Québec**, September 23, 2006. (seminar)
136. "Deciding about actions: The affordance competition hypothesis", *The 34<sup>th</sup> Carnegie Symposium on Cognition*, Carnegie-Mellon University, **Pittsburgh, PA**, June 3, 2006. (invited talk)
137. "Pragmatic representations for action and cognition", *28<sup>th</sup> International Symposium of the GRSNC*, University of Montréal, **Montréal, Québec**, May 8<sup>th</sup>, 2006 (invited talk)
138. "Deciding about actions: The affordance competition hypothesis" Montréal Neurological Institute, **Montréal, Québec**, January 26<sup>th</sup>, 2006. (seminar)
139. "Think before you act, but prepare multiple afforded actions before you think", *An Anniversary Conference Celebrating Steve Grossberg@65 and CNS@15*, **Boston, MA**, September 17, 2005. (invited talk)
140. "A computational model of reach decisions in the primate cerebral cortex", *International Joint Conference on Neural Networks*, **Montréal, Québec**, July 31 – August 4, 2005. (invited talk)
141. "Premotor activity predicting observed actions". *Perception-Action Paris 2005: A symposium on the prediction and perception of action*. **Paris, France**, May 20<sup>th</sup>, 2005. (invited talk)
142. "Neural mechanisms for deciding between actions". Dept. of Physiology, McGill University, **Montréal, Québec**, January 21<sup>st</sup>, 2005. (seminar)
143. "Making decisions about actions" 3<sup>rd</sup> Annual Meeting of the Institute of Neuroscience, Mental Health, and Addiction – Canadian Institutes of Health Research. **Ottawa, Ontario**, November 26<sup>th</sup>, 2004. (invited talk)
144. "Premotor activity during mental rehearsal of learned actions". Dept. of Physiology, Queen's University, **Kingston, Ontario**, August 26<sup>th</sup>, 2004. (seminar)

145. "Neural mechanisms for deciding between actions". Dept. of physiology, Université de Montréal, **Montréal, Québec**, June 22<sup>nd</sup>, 2004. (seminar)
146. "Neural mechanisms for deciding between actions". Krieger Mind/Brain Institute, Johns Hopkins University, **Baltimore, MD**, April 7<sup>th</sup>, 2003. (seminar)
147. "Response selection in premotor cortex and implications for the functional architecture of behavior". Center for Neuroscience, University of California, **Davis, CA**, April 2<sup>nd</sup>, 2002. (seminar)
148. "Response selection in premotor cortex and implications for the functional architecture of behavior". Dept. of Cognitive Science, University of California, **Irvine, CA**, March 4<sup>th</sup>, 2002. (seminar)
149. "Response selection in premotor cortex and implications for the functional architecture of behavior". Dept. of Biomedical Engineering, Johns Hopkins University, **Baltimore, MD**, October 24<sup>th</sup>, 2001. (seminar)
150. "Progressive specification of movement in dorsal premotor and primary motor cortex". Oral presentation at the *11<sup>th</sup> Annual Meeting on Neural Control of Movement*, **Seville, Spain**, March 27<sup>th</sup>, 2001. (invited talk)
151. "Response selection in premotor cortex and implications for the functional architecture of behavior". Dept. of Kinesiology, University of Maryland, **College Park, MD**, February 9<sup>th</sup>, 2001. (seminar)
152. "Response selection in premotor cortex and implications for the functional architecture of behavior". Dept. of Biomedical Engineering, Johns Hopkins University, **Baltimore, MD**, February 12<sup>th</sup>, 2001. (seminar)
153. "A 'two action systems' theory of behavior". Dept. of Physiology, Queen's University, **Kingston, Ontario**, November 17<sup>th</sup>, 2000. (seminar)
154. "The two action systems: specification and selection in the cerebral cortex". The 10<sup>th</sup> Anniversary of the Dept. of Cognitive and Neural Systems, Boston University, **Boston, MA**, May 23<sup>rd</sup>, 2000. (invited talk)
155. "Action selection in the premotor cortex". The 68<sup>th</sup> meeting of l'Association canadienne-française pour l'avancement des sciences, Université de Montréal, **Montréal, Québec**, May 16<sup>th</sup>, 2000. (seminar)
156. "Succumbing to the influence: Making decisions in an uncertain world". Workshop organized (by P. Cisek) at the 10<sup>th</sup> Annual Meeting on Neural Control of Movement, **Key West, FL**, April 12<sup>th</sup>, 2000. Speakers: P. Cisek, M. Basso, P. Glimcher, and M. Shadlen. (invited talk)
157. "The two action systems: specification and selection in the cerebral cortex". Dept. de physiologie, Université de Montréal, **Montréal, Québec**. January 25<sup>th</sup>, 2000. (seminar)
158. "The two action systems: specification and selection in the cerebral cortex". Dept. of Cognitive and Neural Systems, Boston University, **Boston, MA**, September 24<sup>th</sup>, 1999. (seminar)

## **Media / blogs / interviews**

- Feb 28, 2023 “The Evolution of Complex Behavior, Perception, Cognition, Consciousness & the Brain”  
Mind & Matter podcast interview  
<https://mindandmatter.substack.com/p/the-evolution-of-complex-behavior>
- Feb 10, 2022 “Neuroscience needs evolution” Reason with Science podcast interview  
<https://www.youtube.com/watch?v=wNgkeAGoEIs>
- Oct. 12, 2021 Neuroscience and Philosophy Salon  
<https://lce.umd.edu/neuroscience-philosophy-salon/>
- Sept. 2, 2021 New York Times, Opinion “You Are Not Who You Think You Are”  
<https://www.nytimes.com/2021/09/02/opinion/brain-reality-imagination.html>
- August 24, 2021 Quanta Magazine “The Brain Doesn’t Think the Way You Think It Does”  
<https://www.quantamagazine.org/mental-phenomena-dont-map-into-the-brain-as-expected-20210824/>
- October 9, 2020 Learning Salon – <https://www.learningsalon.ai/> [https://www.youtube.com/watch?v=Sx-Hb\\_Ljx3o](https://www.youtube.com/watch?v=Sx-Hb_Ljx3o)
- April 18, 2020 Brain Inspired Podcast #67: Paul Cisek – Backward through the brain  
<https://braininspired.co/podcast/67/>
- April 15, 2020 Brain Inspired Podcast #66: Paul Cisek – Forward through evolution  
<https://braininspired.co/podcast/66/>
- October 31, 2019 Psychonomics Society: #time4action: Resynthesizing cognition – how we should re-make our psychology text books based on evolution and behaviour  
<https://featuredcontent.psychonomic.org/time4action-resynthesizing-cognition-how-we-should-re-make-our-psychology-text-books-based-on-evolution-and-behaviour/>
- October 23, 2019 Numenta: The Affordance Competition Hypothesis  
<https://www.201tube.tv/watch/t1FO-BPS2Q4>
- August 28, 2019 Unsupervised thinking – Episode 48: Studying the brain in light of evolution  
<http://unsupervisedthinkingpodcast.blogspot.com/2019/08/episode-48-studying-brain-in-light-of.html>
- June 9, 2016 Le cerveau à tous les niveaux <http://www.blog-lecerveau.org/blog/2016/06/09/5423/>
- December 7, 2015 University of Montreal Forum  
<http://nouvelles.umontreal.ca/article/2015/12/07/les-decisions-se-prennent-en-agissant/>