

Florent MEYNIEL

PERSONAL INFORMATION

ORCID ID: 0000-0002-6992-678X
Date of birth: June 13th, 1986 (Tours, France)
Married, one child
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CONTACT

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CURRENT POSITION

2020 – Leader of the Inserm/CEA team *Brain Computations*

EDUCATION AND PAST EXPERIENCE

2018 Habilitation to supervise research (*HDR*), from Ecole Normale Supérieure, Paris, France.
2015 – CEA researcher
2013 – 2015 Post-doctoral fellow. Supervisor: Stanislas Dehaene, CEA / Collège de France, Gif sur Yvette, France.
2010 – 2013 PhD in Cognitive Neuroscience. Supervisor: Mathias Pessiglione, ICM/Université Pierre et Marie Curie, Paris, France
Thesis: *How the human brain allocates physical effort over time: evidence from behavior, neuroimaging and pharmacology*
2007 – 2010 MSc, Cognitive Science. Ecole Normale Supérieure, Paris, France.
2009-2010, supervisor: Mathias Pessiglione, ICM, France
2007-2008, supervisor: Catherine Tallon-Baudry, UPMC, France
2008 – 2009 Risk assessment at Lafarge (6 mo) and editorial assistant at Armand Colin (5 mo), Paris.
2006 – 2011 Scholarship at Ecole Normale Supérieure, Dept. of Biology and Dept. of Cognitive Science, Paris, France
2004 – 2006 Intense preparation class (BCPST programm), Lycée Henri IV, Paris.

FELLOWSHIPS AND GRANTS

2020 – 2023 CEA (120 k€, for personnel)
2020 – 2023 CRCNS grant “Explore” (250 k€; US partner: Angela Yu UCSD)
2019 – 2022 Agence Innovation Défense (60 k€, for personnel)
2018 – 2022 Agence Nationale de la Recherche, grant “CONFI-LEARN” (350 k€)
2017 Collège de France, research grant (15k€)
2016 Marie Curie Sklodowska Fellowship (170k€), declined
2013 – 2015 Human Brain Project, postdoctoral fellowship (PI: Stanislas Dehaene)
2011 – 2013 Servier Research grant, academic / pharmaceutical industry collaboration (16 k€)
2011 – 2013 French Ministry of Research PhD grant, 3 years (1 year declined)
2006 – 2011 Ecole Normale Supérieure de Paris, France, 4 years (1 year break)

TEACHING AND MENTORING ACTIVITIES

- 2020 Lectures at Ecole Polytechnique, France
2016 – today Lecturer at the Cogmaster, Ecole Normale Supérieure, Paris.
2012 – today Current PhD student: Tiffany Bounmy
Current students: Caroline Bévalot, Cédric Foucault
Past PhD students: Maxime Maheu
Past MSc students: Tiffany Bounmy, Léo Lebrillant, Sébastien Demortain, Micha Heilbron, Maxime Maheu, Lou Safra, Daniel Schlunegger.
- 2011 – 2013 Teaching assistant, Cognitive Science Master Program, Ecole Normale Supérieure de Paris, France.

INSTITUTIONAL RESPONSIBILITIES

- 2019 – today Scientific advisory for the French Ministry of Education, work-package *Critical Thinking*
2014 – today Co-organizer of the scientific seminar of the Neurospin research center, CEA, France
2013 – 2016 Member of the Human Brain Project Education Programm Committee (advisory board).
10-11/2015 Workshop *Probabilistic inference and the brain*, Collège de France, Paris, France (15 speakers, 120 attendees). Organizer, and co-chair with S. Dehaene (INSERM, France), A. Destehxe (CNRS, France) and W. Maass (Univ. Graz, Austria).
11/09/2013 Workshop *The predictive brain*, ICM, Paris, France (5 speakers, 50 attendees). Organizer. Co-chair: M. Pessiglione.

PEER-REVIEWED PUBLICATIONS IN SCIENTIFIC JOURNALS

1. Le Ster C, Moreno A, Mauconduit F, Gras V, Stirnberg R, Poser B. A., Vignaud A, Eger E, Dehaene S, **Meyniel F**, Boulant N (2019) Comparison of SMS-EPI and 3D-EPI at 7T in an fMRI localizer study with matched spatiotemporal resolution and homogenized excitation profiles. *PLoS ONE* 14(11): e0225286
2. Heilbron M, **Meyniel F** (2019) Confidence resets reveals hierarchical adaptive learning in humans. *PLoS Computational Biology* in press
3. Maheu M, Dehaene S, **Meyniel F** (2019) Brain signatures of a multiscale process of sequence learning in humans. *eLife* 8:e41541
4. Dotan D, **Meyniel F**, Dehaene S (2018) On-line confidence monitoring during decision making. *Cognition* 171:112-121
5. **Meyniel F**, Dehaene S (2017) Brain networks for confidence weighting and hierarchical inference during probabilistic learning. *Proc Natl Acad Sci USA* 114:3859-3868
6. Lefebvre G, Lebreton M, **Meyniel F**, Bourgeois-Gironde S, Palminteri S (2017) Behavioral and neural characterization of optimistic reinforcement learning. *Nature Human Behavior* 1:0067
7. **Meyniel F**, Maheu M, Dehaene S (2016) Human inferences about sequences: A minimal transition probability model. *PLoS Computational Biology* 12: e1005260
8. **Meyniel F**, Goodwin GM, Deakin JFW, Klinge C, MacFayden C, Milligan H, Mullings E, Pessiglione M, Gaillard R (2016) A specific role for serotonin in overcoming effort cost. *eLife*. 5:e17282
9. **Meyniel F**, Sigman M, Mainen ZF (2015) Confidence as Bayesian probability: from neural origins to behavior. *Neuron* 88, 78–92.
10. Dehaene S, **Meyniel F**, Wacongne C, Wang L, Pallier C (2015) The neural representation of sequences: from transition probabilities to algebraic patterns and linguistic trees. *Neuron* 88, 2-19
11. **Meyniel F**, Schlunegger D, Dehaene S. (2015) The sense of confidence during probabilistic learning: A normative account. *PLoS Computational Biology*. 11: e1004305

12. Montejo AL, Deakin JFW, Gaillard R, Harmer CJ, **Meyniel F**, Jabourian AP, Gabriel C, Gruget C, Klinge C, MacFadyen C, Milligan H, Mullings E, Goodwin GM (2015) Better sexual acceptability of agomelatine (25 and 50 mg) compared to escitalopram (20 mg) in healthy volunteers. A 9-week, placebo controlled study using the PRSexDQ scale, *Journal of psychopharmacology*, Epub 0269881115599385
13. **Meyniel F**, Pessiglione M. (2015) Better get back to work: A role for motor beta desynchronization in incentive motivation. *Journal of Neuroscience*. 34: 1–9
14. El Karoui I, King J-R, Sitt J, **Meyniel F**, Gaal SV, Hasboun D, Adamn C, Baulac M, Dehaene S, Cohen L, Naccache L. (2014) Event-Related Potential, Time-frequency, and Functional Connectivity Facets of Local and Global Auditory Novelty Processing: An Intracranial Study in Humans. *Cerebral Cortex*. Bh143
15. **Meyniel F**, Safra L, Pessiglione M. (2014) How the brain decides when to work and when to rest: dissociation of implicit-reactive from explicit-predictive computational processes. *PLoS Computational Biology*. 10: e1003584
16. **Meyniel F**, Sergent C, Rigoux L, Daunizeau J, Pessiglione M. (2013) Neurocomputational account of how the human brain decides when to have a break. *Proc Natl Acad Sci USA*. 110: 2641–2646
17. Tallon-Baudry C, **Meyniel F**, Bourgeois-Gironde S. (2011) Fast and automatic activation of an abstract representation of money in the human ventral visual pathway. *PLoS ONE*. 6: e28229

SUBMITTED PUBLICATIONS

Planton S, van Kerkoerle T, Abbih L, Maheu M, **Meyniel F**, Sigman M, Wang L, Figueira S, Romano S, Dehaene S. Mental compression of binary sequences in a language of thought. Available on PsyArxiv psyarxiv.com/aez4w/

Wilming N, Murphy PR, **Meyniel F**, Donner TH. Disentangling Decision-related Feedforward and Feedback Signals in Human Cortex. Available on bioRxiv: doi.org/10.1101/2020.02.01.929893

Maheu M, **Meyniel F***, Dehaene S*, Rational arbitration between statistics and rules in human sequence learning. Available on bioRxiv doi.org/10.1101/2020.02.06.937706

Meyniel F, Brain dynamics for confidence-weighted learning. Available on bioRxiv: doi.org/10.1101/769315

Tano P, **Meyniel F**, Sigman M, Salles A, Variability in prior expectations explains biases in confidence reports. Available on bioRxiv: doi.org/10.1101/127399

BOOK CHAPTER

Mauras T., Gorsane M.A., **Meyniel F**. (2012), Jeu pathologique et approche neuroéconomique, In *Comprendre, prévenir et soigner le jeu pathologique*, Masson

INVITED TALKS AT CONFERENCES OR RESEARCH DEPARTMENTS

2020 Discussant, workshop on Perceptual confidence and uncertainty, Ecole Normale Supérieure, Paris (postponed due to Covid)

2020 Jerusalem School of Economics *Imprecise cognition and economic behavior*, Jerusalem, Israel (postpone due to Covid)

2019 Seminar at Center for Neural Science, New York University (Wei Ji Ma) and Columbia University (N. Kriegeskorte)

2019 Seminar of Center for Cognitive Science, Univ Ghent, Belgium

2019 Neuroeconomics seminar, Univ. Zurich, Switzerland

2019 Prediction error symposium, Max-Planck institute, Frankfurt, Germany

- 2019 Workshop *Circuit mechanisms of adaptive learning and choice under uncertainty*, Bernstein conference, Berlin, Germany
- 2019 Workshop *Modelling sequential biases in perceptual decisions*, CNS, Barcelona, Spain
- 2019 Workshop *Cognitive control and performance monitoring*, Oostduinkerke, Belgium
- 2019 Institut de Neurosciences de la Timone, Univ. Aix-Marseille, France
- 2018 *Learning in dynamic environments*. Laboratoire Psychologie de la Perception. Univ. Paris V
- 2018 *Subjective confidence reveals the hierarchical nature of learning in dynamic environments*. Institut d'Etudes Avancées, Paris, Workshop "Computational modeling of decision-making across scales"
- 2017 *Learning in an uncertain and changing world*. OECD, Paris, Workshop "The state of Mind in Economics"
- 2017 *Tracking probabilistic inference in M/EEG signals*. ICON, Amsterdam
- 2017 *Perception statistique de séquences aléatoires*, Collège de France, Paris
- 2017 Facebook Artificial Intelligence Research, Paris office, France
- 2017 Stephan Kieble's group, University of Dresden, Germany
- 2016 Steve Fleming's group, University College London, UK
- 2016 Institute of Cognitive Neuroscience seminar, University College London, UK
- 2016 *Computational fingerprints of probabilistic inference in MEG signals*, IOP, La Havana, Cuba
- 2016 *A normative account of the sense of confidence during probabilistic learning*, HWK Workshop on Decision Neuroscience in Humans, Delmenhorst, Germany
- 2016 *A rational sense of confidence during probabilistic inference in the human brain*, EITN, Paris, France
- 2016 Tobias Donner's group University of Hamburg, Germany
- 2016 *A rational sense of confidence during probabilistic inference in the human brain*, Cosyne Workshop, Salt Lake City, USA
- 2015 *Confidence as Bayesian probability: from neural origin to behavior*, Confidence club, ENS Paris, France
- 2015 Alexandre Pouget's group, University of Geneva, Switzerland
- 2015 *A rational sense of confidence during probabilistic inference in the human brain*, Workshop "Probabilistic inference and the brain", Paris, France
- 2015 *A rational sense of confidence during probabilistic inference in the human brain*, Workshop "Subjective confidence: psychology, physiology, theory", Fondation des Treilles, France
- 2015 *Model comparison with Bayesian statistics* Ecole de Neurosciences de Paris, Paris, France
- 2014 *An accurate sense of confidence during probabilistic reasoning* Theory – Cognition workshop, Human Brain Project annual submit 2014, Heidelberg, Germany
- 2014 *Subjective confidence and learning under multiple levels of uncertainty* Theory – Cognition workshop, the European Institute for Theoretical Neuroscience, Paris, France
- 2014 Mariano Sigman's group, Univ. Torcuato di Tella, Buenos Aires, Argentina
- 2014 Zach Mainen's group, Champalimad Center for the Unknown, Lisbon, Portugal

CONFERENCE POSTERS

(only first-author posters are listed)

- 2019 Meyniel F. Brain dynamics for confidence-weighted learning (Bernstein, Berlin)
- 2018 Meyniel F., Pouget A., Learning through recurrent dynamics (Cosyne, Denver)
- 2015 Meyniel F., Dehaene S., Probabilistic learning in the brain: A normative account of the sense of confidence, Brain Conference FENS/The Brain Prize (Rungstedgaard, Denmark)

- 2014 Meyniel F. Dehaene S., A sense of confidence in the brain: experimental and theoretical challenges, Human Brain Project annual summit (Heidelberg, Germany)
- 2013 Meyniel F., Safra L., Pessiglione M., How we optimize effort allocation: behavioral evidence for an accumulation model with dissociable implicit and explicit costs, Cognitive Neuroscience Society (San Francisco, USA)
- 2013 Meyniel F. Pessiglione M., Better get back to work: a role for motor beta de-synchronization in incentive motivation, Symposium on Biology of Decision Making (Paris, France)
- 2012 Meyniel F., Pessiglione M., Motivational modulation of motor beta de-synchronization during effort preparation, Biomagnetism (Paris, France)
- 2012 Meyniel F., Sergent C., Rigoux L., Daunizeau J. , Pessiglione M., Cost evidence accumulation for online management of effort production: convergent MEG and fMRI data, Human Brain Mapping (Beijing, China)
- 2012 Meyniel F., Safra L., Pessiglione M., Dissociable costs: effects of expected versus experienced task difficulty on effort allocation, Symposium on Biology of Decision Making (Paris, France)
- 2011 Meyniel F., Rigoux L., Daunizeau J. , Pessiglione M., Accumulating pain evidence to optimize effort production: a model-based fMRI study, Human Brain Mapping (Québec, Canada)

MAJOR ON-GOING COLLABORATIONS

- Stanislas Dehaene, CEA / Collège de France. Project: rule induction from sequences of observations.
- Tobias Donner, University Medical Center Hamburg-Eppendorf, Germany. Project: Brain imaging of subjective confidence.
- Rava A. da Silveira, Ecole Normale Supérieure de Paris, France & Princetown University, USA. Project: computational model of sequential inference and choice.
- Wei Ji Ma, New York Univ. USA. Project: neural representation of uncertainty
- Alexandre Pouget, Univ. of Geneva, Switzerland. Project: neuronal networks for confidence-weighted learning
- Angela Yu, Univ. California San Diego, USA. Project: neural bases of exploration (co-PI on CRCNS grant)

SERVICES TO THE SCIENTIFIC COMMUNITY

Ad-hoc reviewer for: Brain Research, Cognition, Current Biology, eLife, Journal of Experimental Psychology, Journal of Neuroscience, Nature Neuroscience, Nature Communications, Nature Human Behavior, NeuroImage, Neuroscience of Consciousness, Plos Biology, Plos Computational Biology, Psychophysiology, Scientific Reports.

Academic Editor at Plos One.

Grant program: ERC (European Union), FWO (Belgium), OSF (Poland), ANR (France)

CONTRIBUTIONS TO DISSEMINATE SCIENCE IN THE SOCIETY

- 2011 – today: Co-director of the book series *Sciences Durables* Eds. Rue D'Ulm, which publishes academic research accessible to a general reader www.presses.ens.fr/collections_26_sciences-durables.html
- 2007 – 2011: editor and regular contributor in *Le Prisme à Idées*, a popular science journal www.prismeaidées.net
- Popular science articles and interviews in *Cerveau & Psycho* (2014, 62:76-79; 2015, special issue “l'Essentiel” February-April), *Le Monde* (February 7th 2013, April 8th 2013), for the Dana Foundation (July 2016)