Rémi Gau

Languages: French, English, German (basics)

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CURRENT POSITION

- **Since February 2012:** **PhD in Neuroscience**

  Laboratories:
  Computational Cognitive Neuroimaging Laboratory, School of psychology, University of Birmingham, UK
  registered at the *International Max Planck Research School*, Graduate training centre of neuroscience, Tübingen, Germany

  Thesis title: Cortical laminar analyis of multisensory integration using high-field fMRI

  Supervisor: Pr. Dr. MD. Uta Noppeney Email: u.noppeney@bham.ac.uk

This second PhD focused on the study of the neural correlates of multisensory integration using psychophysics and functional MRI in humans.

I conducted studies to investigate:

- the neural correlates of processing contextual sensory congruency and its effects on new incoming audio-visual speech inputs,
- how attention modulates the integration of auditory and visual stimuli across the depth of the cortex in primary and secondary sensory cortices,
- at which cortical depth a primary sensory region is best able to distinguish between two non-preferred sensory inputs.

ACADEMIC QUALIFICATIONS

- **2006-2010:** **PhD in neuroscience** Defended in September 2010

  University Pierre et Marie Curie, Paris, France
  Doctoral School « Cerveau, Cognition, Comportement »
  first class honours

  Thesis title: Serotonergic neurons of the lateral paragigantocellular nucleus: roles in pain modulation and baroreflex inhibition

  Laboratory: Psychiatry and Neurosciences Center

  Supervisor: Dr. MD. Jean-François Bernard

The first Phd focused on the study of pain, its modulation and its associated autonomous responses in rats.

My work included:

- the *in-vivo* single unit electrophysiological recording of serotonergic neurons of the rostroventromedial medulla (RVM) and their response to noxious stimulation.
- the stereotatically directed pharmacological inactivation of these neurons combined with direct online cardiovascular parameters (heart rate, blood pressure) recording, as well as immunohistochemical techniques (neuroanatomical tracers, functional c-fos expression) to assess the role of the RVM in cardiovascular regulations.

Graduate qualifications

- **2005-2006:** **Master of Integrative Biology and Physiology: Neurosciences (research specialization)**
  University Pierre et Marie Curie, Paris, France
  Second class honours ; rank: NA
- **2004-2005:** **Master of Neuropsychology (research specialization)**
  University Paul Sabatier, Toulouse, France
  Second class honours ; rank: NA
- **2003-2004:** **Master of Cellular Biology and Animal Physiology**
  McGill university,Montréal, Canada, through the CREPUQ exchange program with the University of Montpellier II, France
  Second class honours; rank: 1/55

Undergraduate qualifications

- **2002-2003:** **License of Cellular Biology and Animal Physiology**
  University of Montpellier II, France
  Second class honours; rank: 1/80
- **2001-2003:** **Diplôme d'Etudes Universitaires Générales of Psychology**
  University Paul-Valéry, Montpellier, France
  Second class honours ; rank: NA
- **2000-2002:** **Diplôme d'Etudes Universitaires Générales of Biochemistry and Physiology**
  University of Montpellier II, France
  First class honours; rank: 3/250

Baccalaureate

- **2000:** **International Baccalaureate**
  Red Cross Nordic United World College, Flekke, Norway
  Grade: 36/45

PUBLICATIONS

Peer reviewed papers

• **Gau R**, Noppeney, U; How prior expectations shape multisensory perception, *Neuroimage*, 2016; DOI: 10.1016/j.neuroimage.2015.09.045, GitHub repository

• **Gau R**, Sevoz-Couche C, Hamon M, Bernard JF; Noxious stimulation excites serotonergic neurons: a comparison between the lateral paragigantocellular reticular and the raphe magnus nuclei, *Pain*, 2013; DOI: 10.1016/j.pain.2012.09.012

• **Gau R**, Sevoz-Couche C, Laguzzi R, Hamon M, Bernard JF; Inhibition of Baroreflex by Nociception: A Key Role for Lateral Paragigantocellular Serotonergic Cells, *Pain*, 2009; DOI: 10.1016/j.pain.2009.09.018

• Bernard JF, Netzer F, **Gau R**, Hamon M, Laguzzi R, Sevoz-Couche C; Critical role of B3 serotonergic cells in baroreflex inhibition during the defense reaction triggered by dorsal periaqueductal gray stimulation, *Journal of comparative anatomy*, 2008; DOI: 10.1002/cne.21532

Posters

• **Gau R**, Trampel R, Bazin PL, Turner R, Noppeney U; Layer-specific attentional modulation and multisensory interactions in sensory cortices, Annual Meeting of the Organization for Human Brain Mapping, Geneva (Switzerland), 2016; DOI: 10.13140/RG.2.2.32219.57124

• **Gau R**, Trampel R, Bazin PL, Turner R, Noppeney U; Effect of sensory modality and attention on layer-specific activations in sensory cortices, Annual Meeting of the Organization for Human Brain Mapping, Hamburg (Germany), 2014; DOI: 10.13140/RG.2.2.18797.79846

• **Gau R**, Noppeney U; The left prefrontal cortex controls information integration by combining bottom-up inputs and top-down predictions, Annual meeting of the Society for neurosciences, San Diego, (California, USA), 2013; DOI: 10.13140/RG.2.2.12086.91207

• Bernard JF, Sevoz-Couche C, Hamon M, **Gau R**; Responses of lateral paragigantocellular and

raphe magnus serotonergic neurons to noxious stimuli: a comparative reappraisal using juxtacellular recording, 13th world congress on pain; International association for the study of pain; Montréal (Québec, Canada), 2010

• Bernard JF, Sevoz-Couche C, Hamon M, **Gau R**; Involvement of lateral paragigantocellular reticular serotonergic and non-serotonergic neurons in nociceptive processes, Annual meeting of the Society for neurosciences, Chicago, (Ilinois, USA), 2009

• **Gau R**, Sevoz-Couche C, Hamon M, Laguzzi R, Bernard JF; Inhibition of cardiac baroreflex by intense noxious stimuli: a serotonergic mechanism involving the lateral paragigantocellular reticular nuclei; Annual meeting of the Society for neurosciences, Washington (D.C., USA), 2008

• Bernard JF, Sevoz-Couche C, Hamon M, Laguzzi R, **Gau R**; Critical role of the B3 group in the baroreflex inhibition evoked by thermal noxious stimulation in the rat, Annual meeting of the Society for neurosciences, San Diego (California, USA), 2007

• Bernard JF, Netzer F, **Gau R**, Hamon M, Laguzzi R, Sevoz-Couche C; Serotonergic neurons of B3 group: critical role in baroreflex inhibition during the defense reaction in the rat; Annual meeting of the Society for neurosciences, Atlanta (Georgia, USA), 2006

Talks

• **Gau R**; Laminar profiles dissociate attentional and crossmodal influences in sensory cortices; Brain in Depth 2018, Magdeburg (Germany), 31rst May 2018

• **Gau R**; Implication du groupe sérotoninergique B3 dans le contrôle des circuits de la douleur et des réactions neurovégétatives associées; 10th congress of the French society for the study and treatment of pain, Marseille (France), 18th November 2010

TEACHING EXPERIENCE

• **2nd Semester of 2013 to 2016:** Teaching assistant for the *Advanced Brain Imaging* masters course at the University of Birmingham (UK); GitHub repository

Supervisor: Noppeney, U; Email: u.noppeney@bham.ac.uk

• **2nd Semester 2009:** Teaching assistant for the *Human Evolution* class of the preparatory program to paramedical training at the University Pierre et Marie Curie (Paris, France)

Supervisors: Aurengo, A & Darribere, T; Tel: (+33) 1 40 77 95 77

• **1rst Semester 2005:** Teaching assistant for the *Psychophysiology* undergraduate class of the psychology program of the University Mirail-Toulouse II (France)

Supervisor: Bretdibat JL; Email: bretdiba@univ-tlse2.fr

RESEARCH AND TECHNICAL SKILLS

• **Human neuroimaging:** design, implementation and analysis of structural and functional MRI studies, fMRI design efficiency optimization, preprocessing, mass univariate and multivariate pattern analysis, high-field structural and functional MRI analyses

• **Cognitive neuroscience:** design, implementation and analysis of psychophysics and eyetracking studies of multi-sensory integration

- **Information technology:**

Program	Area	Knowledge
Matlab	Programming	Excellent
SPM	Neuroimaging analysis	Excellent
Freesurfer	Neuroimaging analysis	Excellent
CBS tools	High-field neuroimaging analysis	Excellent
LIBSVM	Multivariate pattern analysis	Excellent
PsychToolBox	Stimulus presentation	Excellent
Presentation	Stimulus presentation	Excellent
Bash scripting	Programming	Good
cvMANOVA	Multivariate pattern analysis	Good
Palamedes	Psychophysics data analysis	Good
Spike 2	Physiological data recordings	Good
Git/GitHub	Version control	Good
SPSS	Statistical analysis	Good
LaTeX	Document production	Good
R	Programming	Basic
C/C++	Programming	Basic
FSL	Neuroimaging analysis	Basic
Pronto	Multivariate pattern analysis	Basic
TDT	Multivariate pattern analysis	Basic

- **Functional neuroanatomy:** direct online physiological parameters recording and analysis, use of neuroanatomical tracers (Phaseolus, TMR, fluorogold), functional c-fos expression experiments, stereotaxic local pharmacological neuroinactivation.

- **Electrophysiology:** *In vivo* extracellular recording combined to juxtacellular labeling in halothane anesthetized rats, LTP protocols and associated pharmacological modulation on rat brain slices using intracellular recording in current clamp or extracellular recording with a multi-electrodes array.

- **Microscopy & histology:** Total animal fixation with formalin & brain extraction, general histological techniques (Cresyl violet, thionin), double immunohistochemical and immunofluorescent labeling, epifluorescent transmission and confocal microscope images acquisition and processing.

PROFESSIONAL ACTIVITIES

Journal referee for

- Journal of Experimental Neuroscience
- Proceedings of the Annual Conference of the Cognitive Science Society

Societies membership

- Society for Neuroscience
- Organization for Human Brain Mapping

Outreach

- Our brain, our senses, and us; Interactive presentation given at the children section of the Skeptics in the Pub of Gravesend (UK); 20th October 2015

Internal discussion

- Brain droppings on the replication crisis in psychology; talk given at the post-graduate seminar of the Shcool of Psychology at the University of Birmingham (UK); 24th November 2016

Others

- Co-organizer of the EiF Journal Club on methodology and replicability in psychology at the University of Birmingham (UK)

SCHOLARSHIPS & AWARDS

- **2009-2010:** Award from the French society for the study and treatment of pain
- **2006-2009:** Scholarship from the French ministry of research and technology

OTHER ACADEMIC APPOINTMENTS

Laboratory training

- **2003-2005**: Conducted the data analysis of a pilot study preliminary to a multicentric rehabilitation program for dyslexic children.

Laboratory: Neuroimaging and neurological handicaps
INSERM unit 825, Hôpital Purpan, Toulouse, France
Supervisor: Dr. MD. Demonet JF
Email: jean-francois.demonet@inserm.fr

- **2004:** Worked on electrophysiology experiments aimed at better understanding the effects of dopamine on the long term potentiation (LTP) of pyramidal neurons in slices of rat prefrontal cortex.

Laboratory: Laboratoire de biologie des processus adaptatifs
University Pierre et Marie Curie, Paris, France
Supervisor: Dr. Otani S
Email: satoru.otani@snv.jussieu.fr

- **2003:** Designed and applied a series of experiments examining the effects of prenatal stress or in-utero cocaine injection on learning in young rats and on hippocampic long term potentiation on rat brain slices.

Laboratory: Laboratoire de plasticité cérébrale
CNRS-UMR 5102, University of Montpellier II, France
Supervisor: Dr. Vignes M
Email: mvignes@univ-montp2.fr