



TIMING RESEARCH FORUM

**1st Conference
of the
Timing Research Forum
Scientific Program**



Strasbourg, France
23-25th October 2017

*We are pleased to welcome you to the
1st Annual Conference of the Timing Research Forum
In Strasbourg, France*

Overview

TRF is a unique international conference dedicated to multidisciplinary research on timing and time perception. It encompasses all aspects of timing research (see the abstract keywords' cloud on the back cover page) from a variety of different approaches including experimental psychology, neuroscience, modeling, neurology and, philosophy. The conference comprises a variety of themed symposia, as well as oral and poster presentations. We strove to strike a balance in the number of presentations by junior and senior researchers. This is particularly reflected in our choice of Keynote speakers: talks from two leading experts in the field (Warren Meck and Lera Boroditsky) are complemented by a talk from an early career researcher (Sofia Soares), who was selected by the TRF committee on the basis of recently published scientific work.

After the success of the "TIMELY" European COST program, we all felt the need for a regular conference on timing, to provide a forum for researchers of the growing timing community to interact with one another. The large number of abstracts we received for the 1st Annual Conference of the Timing Research Forum exceeded our expectations and, more importantly, confirmed the need for such a conference. We hope this conference will be followed by many others, which would fulfill TRF's primary objective: to let timing research blossom.

Organizers:



Anne
GIERSCH



Jenny
COULL



Argiro
VATAKIS



Sundeep
TEKI

About the Timing Research Forum

Timing Research Forum (TRF) is an open academic society for promoting multidisciplinary research on timing and time perception. Established in 2016 by Sundeep Teki and Argiro Vatakis, the aim of TRF is to bring together researchers with an interest in understanding timing on a common platform. TRF encourages 'open science' and collaboration amongst its membership through organizing conferences and sharing relevant information and resources through its website, newsletter, and social media channels.

TRF is delighted to welcome you all to Strasbourg for the very first conference of our society. We are grateful for the incredible response, reflected in the large number of submissions which exceeded all our expectations! We are also thankful to Anne Giersch and Jenny Coull for hosting TRF1 conference and putting together an exciting scientific and social program for the benefit of the entire timing research community!

* Visit the TRF website: timingforum.org

* Upload your posters/slides at TRF1's dedicated website at the Open Science Foundation: osf.io/view/trf2017

* Follow TRF on social media:

- [Researchgate.net/project/Timing-Research-Forum](https://www.researchgate.net/project/Timing-Research-Forum)
- [Facebook.com/timingresearchforum](https://www.facebook.com/timingresearchforum)
- [Twitter.com/TimingForum](https://twitter.com/TimingForum)

* Contact us at trf@timingforum.org

With best wishes,
Sundeep Teki & Argiro Vatakis

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VENUE



The venue for the conference is the **University Palace**, which is located in the historic part of Strasbourg University, in the 'Neustadt' district of Strasbourg.

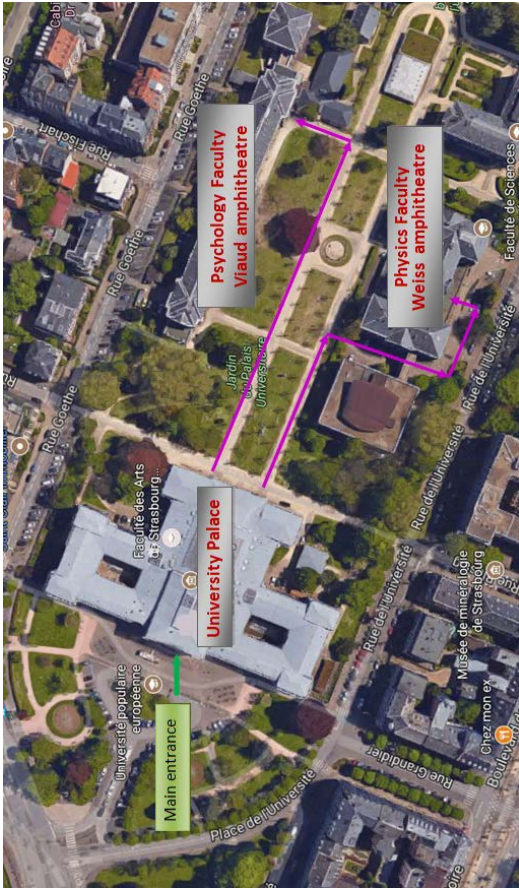
The center of Strasbourg has been a UNESCO site since 1998, and the Neustadt was classified as a World Heritage site in 2017. It dates back to the end of the 19th century when Strasbourg was German.

Plenary sessions and half of the parallel sessions will take place in the Pasteur room ('Salle Pasteur') of the University Palace, and the other parallel sessions will take place either in the Viaud amphitheater in the Psychology Faculty (Monday and Tuesday) or in the Weiss amphitheater in the Physics Institute (Wednesday). Students will guide you there (a map can be found on next page).

Registration will take place in the University Palace immediately after the main Entrance. Poster sessions and lunches will be located in the Hall behind the registration desk.

MAP

More maps can be found in the
Conference bag



GENERAL INFORMATION

REGISTRATION

The registration desk will be located right in front of you, on your right, when you enter the University Palace. It will open from 8:00 AM on Monday 23rd. We will have a limited time to get everyone registered, so please come early!

PLENARY SESSIONS will take place in the 'Salle Pasteur' (1st Floor of the University Palace). Follow the signs!

PARALLEL SESSIONS will take place in the 'Salle Pasteur' of the University Palace, or in the Viaud amphitheater of the Psychology Faculty (Monday and Tuesday) or in the Weiss amphitheater in the Physics Institute (Wednesday). Students will guide you there (see map on page 7).

POSTERS will be displayed on the Ground Floor in the Hall behind the registration desk. Poster grids will be numbered and you can find the number for your poster in this program. An updated list will be available for both sessions. Please mount your posters by noon. We expect you to be present in front of your poster for at least one hour of the session.

INTERNET/WIFI will be available in the University Palace (in addition to Eduroam): **conf-trf password=trf2017**.

NAME BADGES: Your name badge is your official conference identification document, so delegates are asked to wear the name badges at all times whilst at the conference venue.

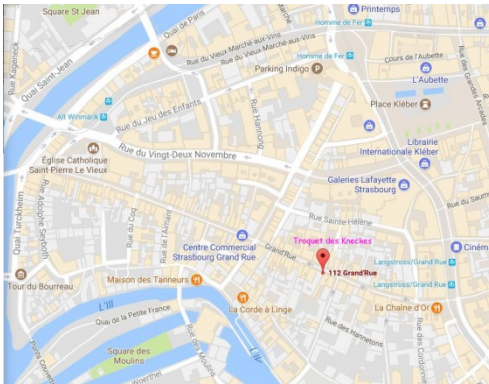
LOST & FOUND: For lost and found personal belongings, please contact the conference desk.

COFFEE BREAKS: will take place in front of the Salle Pasteur (1st floor University Palace).

LUNCH: A free buffet lunch will be available in the Hall on the ground floor of the University Palace, near the posters.

SOCIAL EVENTS

SUNDAY 6PM A get-together meeting is organized on Sunday evening from 6PM in the Bar 'Troquet des Knecks', 112 grand-rue



TUESDAY 6:00 PM Free visits to the Hospital wine cellar (1, place de l'Hôpital) or the Notre-Dame Museum (3, place du Château) have been organized for a limited number of participants, on a first-come first-serve basis. If you have been informed by e-mail that you are part of one of the tour groups, please note that visits will start at 6PM on site. Please ask for maps at the registration desk.



TUESDAY 8:30 PM the Gala Dinner will take place in the Kammerzell restaurant, which is right next to the Cathedral: 16, place de la Cathédrale

MONDAY morning at a glance

9:00-9:15

Welcome – Salle Pasteur

9:15-9:45

Plenary session – Salle Pasteur

Lera Boroditsky

How Language Constructs Time

9:45-11:00

Parallel sessions – Symposium

Salle Pasteur

Neural Entrainment as a Mechanism of
Efficient Stimulus Processing

Symposium organiser: Zoefel

9:45-11:00

Parallel sessions – Symposium

Amphitheater Viaud

Interrelations between the Representation
of Time and Space

Symposium organiser: Riemer

11:00-11:30

Coffee break

11:30-13:00

Parallel sessions – Short oral presentations

Salle Pasteur

Temporal Expectation

11:30-13:00

Parallel sessions – Short oral presentations

Amphitheater Viaud

Modulation and Representation of Perceived
Time

13:00-14:30

Lunch

MONDAY afternoon at a glance

14:30-15:45

Parallel sessions – Symposium

Salle Pasteur

Musical Rhythm: Evolutionary and Cross-cultural Perspectives

Symposium organisers: Ravignani & Jacoby

14:30-15:45

Parallel sessions – Symposium

Amphitheater Viaud

Timing and Conditioning: A Contemporary Overview

Symposium organisers: Jennings & Bonardi

15:45-16:15

Coffee break

16:15-17:30

Parallel sessions – Symposium

Salle Pasteur

Time Processing Deficits in Developmental Disorders

Symposium organiser: Trainor

Parallel sessions – Symposium

Amphitheater Viaud

Temporal Organization of Perceptual Processes by Motor-driven Low- frequency Neuronal Oscillations

Symposium organiser: Morillon

17:30-19:00

Poster session & Drinks

Hall Ground floor

MONDAY 9.15am-9.45am

Keynote lecture: Lera Boroditsky

Plenary session Salle Pasteur

Lera Boroditsky is an associate professor of cognitive science at University of California, San Diego. Her research is focused on understanding whether, and if so how, language shapes the way we think (Linguistic relativity). She has investigated the use of spatial metaphors for time in a wide variety of languages and cultures, and demonstrated that the way in which we *talk* about time helps construct our fundamental concept of time. She has received several awards for her work and was named an Utne Reader Visionary. She is editor in chief of *Frontiers in Cultural Psychology*.



How Language Constructs Time

How do people construct their mental representations of time? I focus on work examining the role that spatial metaphors and basic spatial representations play in constructing representations of time across languages. The results reveal that the metaphors we use to talk about time have both immediate and long-term consequences for how we conceptualize and reason about this fundamental domain of experience. How people conceptualize time appears to depend on how the languages they speak tend to talk about time, the current linguistic context (what language is being spoken), and also on the particular metaphors being used to talk about time in the moment. Further, people who conceptualize space differently also conceptualize time differently suggesting that people co-opt representations of the physical world (e.g., space) in order to mentally represent more abstract or intangible entities (e.g., time).

Taken all together, these findings show that conceptions of even such fundamental domains as time differ dramatically across cultures and groups. The results reveal some of the mechanisms through which languages and cultures help construct our basic notions of time.

MONDAY 9.45am-11am

Parallel Sessions

Symposium 1

Neural Entrainment as a Mechanism of Efficient Stimulus Processing (Benedikt Zoefel)

Speakers: Monica N. O'Connell (USA), Molly J. Henry (Canada), Sanne Ten Oever (The Netherlands), Benedikt Zoefel (UK)

Salle PASTEUR

Mapping the Circuitry of Oscillatory Phase Reset

Monica N. O'Connell, Annamaria Barczak, Tammy McGinnis, Deborah Ross, and Peter Lakatos

Separating Stimulus-driven and Entrained Neural Responses using Musical Rhythms

Molly J. Henry

Temporal Expectations Influence Entrainment Presence and Strength

Sanne Ten Oever

Phase Entrainment of Neural Oscillations is Causally Relevant for Neural Responses to Intelligible Speech

Benedikt Zoefel, Alan Archer-Boyd, and Matthew H. Davis

Symposium 2

Interrelations between the Representation of Time and Space (Martin Riemer)

Speakers: Martin Riemer (Germany), Roberto Bottini (Italy), Baptiste Gauthier (France)

Amphitheater VIAUD

Integration Processes of Travel Time and Traveled Distance

Martin Riemer, Esther Kühn, Jonathan Shine, and Thomas Wolbers

The Role of Vision in Space-Time Interactions

Roberto Bottini

Ordering Events in Time and Space in Mental Travels

Baptiste Gauthier, Karin Pestke, and Virginie van Wassenhove

MONDAY 11.30am-1pm

Parallel Sessions

Session 1: Short talks

Temporal Expectations (Chair: Anne Giersch)

Salle PASTEUR

Implicit Temporal Predictability improves Auditory Pitch Discrimination Sensitivity

Sophie K. Herbst (Germany), Virginie van Wassenhove, and Jonas Obleser

Saccadic Inhibition as an Index of Anticipation in a Discrimination Task

Roy Amit (Israel), Dekel Abeles, Marisa Carrasco, and Shlomit Yuval-Greenberg

Neurological Evidence of a Dual Origin of the Foreperiod Effect

Bertrand Degos (France), Ilhame Ameqrane, Sophie Rivaud Péchoux, Pierre Pouget, and Marcus Missal

Prospects of a Multiple Trace Theory of Temporal Preparation

Sander Los (The Netherlands), Wouter Kruijne, and Martijn Meeter

Task-oriented Optimal Inference in Interval Timing

Zhenguang Cai (UK) and Maarten Speekenbrink

Human Perceived Timing follows Principles of Bayesian Inference

Darren Rhodes (UK) and Massimiliano Di Luca

MONDAY 11.30am-1pm

Parallel sessions

Session 2: Short talks

Modulation and Representation of Perceived Time (Chair: Marc Wittmann)

Amphitheater VIAUD

How Pain Affects Time Estimation. A Physiological Study

Andrea Piovesan (UK), Laura Mirams, Helen Poole, David Moore, Michael Richter, and Ruth Ogden

Caloric Rewards Alter Time Perception and Time-Dependent Decision Making

Bowen J Fung (Australia), Stefan Bode, and Carsten Murawski

Temporal Representations in the Duration Discrimination Task

Başak Akdoğan (USA), Randy Gallistel, Ben Gersten, Amita Wanar, and Peter Balsam

The Relation Between Symbolic and Non-symbolic Representations of Time

Karina Hamamouche (USA) and Sara Cordes

Modality Specific Rate Aftereffects: Evidence Towards Distributed Timing Mechanisms

Aysha Motala (UK) and David Whitaker

Observers Adapt to the Physical, not the Perceived Duration of Visual Events

Jim Maarseveen (The Netherlands), Chris L. E. Paffen, Frans A. J. Verstraten, and Hinze Hogendoorn

MONDAY 2.30pm-3.45pm

Parallel sessions

Symposium 1

Musical Rhythm: Evolutionary and Cross-cultural Perspectives (Andrea Ravignani & Nori Jacoby)

Speakers: Aniruddh D. Patel (USA & Canada), Jessica A. Grahn (Canada), Nori Jacoby (USA), Andrea Ravignani (The Netherlands)

Salle PASTEUR

Predictive and Tempo-flexible Synchronization to a Visual Metronome in Monkeys

Aniruddh D. Patel, Ryuji Takeya, Masashi Kameda, and Masaki Tanaka

The Evolution of Rhythm between Biology and Culture

Andrea Ravignani, Tania Delgado, and Simon Kirby

Rhythmic Perceptual Priors Revealed Cross-culturally by Iterated Reproduction

Nori Jacoby and Josh McDermott

Cross-cultural Comparisons of Neural and Motor Entrainment to the Beat

Jessica A. Grahn and Daniel J. Cameron

Symposium 2

Timing and Conditioning: A Contemporary Overview (Domhnall Jennings & Charlotte Bonardi)

Speakers: Domhnall Jennings (UK), David Sanderson (UK), Randy Gallistel (USA), Charlotte Bonardi (UK)

Amphitheater VIAUD

Temporal Control of the Conditioned Response following CS-Preexposure: Retarded Learning does not mean Retarded Timing

Domhnall Jennings and Charlotte Bonardi

Rate-sensitive Learning requires the GluA1 Subunit of the AMPA Receptor

David J. Sanderson, Joseph, M. Austen, and Rolf Sprengel

The Bernoulli-Gauss and the No-US

Charles Randy Gallistel

The Effects of Stimulus Distribution Form on Trace Conditioning

Charlotte Bonardi and Domhnall Jennings

MONDAY 4.15pm-5.30pm

Parallel sessions

Symposium 1

Time Processing Deficits in Developmental Disorders (Laurel Trainor)

Speakers: Andrew Chang (Canada), Barbara Tillman (France), Usha Goswami (UK), Christine Falter-Wagner (Germany)

Salle PASTEUR

Auditory Timing Deficits in Developmental Coordination Disorder

Andrew Chang, Jennifer Chan, Yao-Chuen Li, John Cairney, and Laurel J. Trainor

Temporal Processing Deficits and Benefits of Rhythmic Auditory Stimulation on Syntax Processing in Developmental Language Disorders

Barbara Tillmann, Laure-Hélène Canette, and Nathalie Bedoin

Reading, Rhythmic Timing and the Brain

Usha Goswami

Time Processing in ASD and ADHD: Shared Deficit or Disorder-specific Abnormalities?

Valdas Noreika and Christine Falter

Symposium 2

Temporal Organization of Perceptual Processes by Motor-driven Low- frequency Neuronal Oscillations (Benjamin Morillon)

Speakers: Luc Arnal (Switzerland), Benjamin Morillon (France), Alice Tomassini (The Netherlands)

Amphitheater VIAUD

A Proactive Sense of Time in Action

Luc H. Arnal

Motor Origin of Temporal Predictions in Auditory Attention

Benjamin Morillon

Theta Oscillations Synchronize Perception with Motor Intention

Alice Tomassini, Pieter Medendorp, and Eric Maris

POSTER SESSION 5.30pm-7.00pm In the hall: Ground floor

- 1. Time Perception in Long Term Memory**
Joffrey Derouet, Sylvie Droit-Volet, and Valérie Doyère
- 2. Executive Processes and Timing: Comparing Timing with and without Reference Memory**
Ruth Ogden, Rhiannon Mackenzie-Phelan, Catharine Montgomery, John Fisk, and John Wearden
- 3. Retrospective Time Reproductions revealed a large Memory for Modulating Music**
Érico Firmino, Carol Krumhansl, and José Lino Oliveira Bueno
- 4. The Effect of Physiological and Psychological Stress on Temporal Memory**
Raquel Cocenas-Silva, Sylvie Droit-Volet, and Edilaine Gherardi-Donato
- 5. Evidence against Increased Temporal Resolution Induced by Images That Give Impression of Danger**
Keishi Nomura and Yuko Yotsumoto
- 6. Climbing and Timing: Attentional Biases Mediate the Affect-time Perception binding in a high risk sport**
Judith Castellà, Cristina Cuello, and Antoni Sanz
- 7. The Effect of Fearful Faces On Timing Mechanisms of The Brain**
Emre H Kale, Sertaç Üstün, and Metehan Çiçek
- 8. Emotions and Brain Wave Activities: Determinants of Psychological Time**
Aman Choudhary, Shashvat Shanker, and Priyanka Kacker
- 9. Induced Anxiety Leads to Underestimating Time**
Ioannis Sarigiannidis, Christian Grillon, Monique Ernst, Jonathan Roiser, and Oliver Robinson
- 10. Effect of contemplative Rooms on the Perception of Time**
Sonja Ehret, Joana Post, Miriam Ruess, and Roland Thomaschke

MONDAY posters

11. Meditation-induced Changes in Subjective Time are mediated by Heart-rate Variability and Breathing Rate

Damisela Linares Gutierrez, Sebastian Kübel, Anne Giersch, Stefan Schmidt, Karin Meissner, and Marc Wittmann

12. The Effect of Focused-attention Meditation Dosage on Time Perception

Zaffie Cox and Dinkar Sharma

13. Time Estimation and Body Awareness

Tereza Nekovarova, Katerina Sedlakova, Adela Beckova, Kristyna Maleninska, Jan Rydlo, and Jiri Horacek

14. Effects of Delayed Auditory Feedback on Temporal Reproduction Task with Single Motor Response

Keita Mitani and Makio Kashino

15. Time Limit Decreases the Accuracy of the Sequential Lever-press Performance in Rats

Yayoi Sekiguchi and Toshimichi Hata

16. Pre Feeding and Timing: Temporal and Motivational Mechanisms of Discrimination

Oscar Zamora-Arevalo, Mayra, Cruz-Flores, and Mario Perez-Calzada

17. Money is Time: Monetary-Reward Expectancy Distorts Perception of Duration

Mitra Taghizadeh Sarabi, Hiroomi Kuninori, Ryuta Aoki, and Kiyoshi Nakahara

18. Neural Mechanisms Underlying Time Perception and Reward Prospect

Nihal Apaydın, Emre Kale, Sertaç Üstün, İpek Çelikağ, Bora Baskak, Halise Devrimci-Özgüven, and Metehan Çiçek

19. Visual and Phonological Repetition, but not Semantic Repetition, compresses Perceived Duration

Zhuanghua Shi and Lina Jia

20. Emotional Content Rather than Familiarity Could be the Reason Behind Distorted Time Perception in Addiction

Lazaros Gonidis and Dinkar Sharma

21. The Effects of Gambling Related Stimuli on the Time Perception of Gamblers and Non-Gamblers

Lazaros Gonidis and Dinkar Sharma

MONDAY posters

22. Effect of Entrainment at Intermodulation Frequency on Perceived Duration

Shogo Ito and Yuko Yotsumoto

23. Application of Fourier Analysis to Flicker Perception

Anderson Rodrigues, Eline Melo, and Claudio Teixeira

24. Age-Related Effects on Center-Surround Interactions and Flicker Perception

Claudio Teixeira, Beatrice Ono, Anderson Rodrigues, and Jan Kremers

25. Where Does Time Go When You Blink?

Shany Grossman, Chen Gueta, Rafael Malach, and Ayelet Landau

26. Time Dilation is Independent of Stimulus Eccentricity in the Visual Field

Xiaoxuan Li and Yan Bao

27. Synchronising to a Frequency While Estimating Time, But Just When you are Aware of It

David Casilimas Diaz, and José Lino Oliveira Bueno

28. A Bayesian Perspective on Accumulation in the Magnitude System

Benoit Martin, Martin Wiener, and Virginie van Wassenhove

29. The effect of Abstract Numerals on Long-range Time Interval Estimation

Camila Agostino, Peter Claessens, Fuat Balci, and Yossi Zana

30. The Impact of Perceptual/Concurrent and Mnemonic Digits on Temporal Processing: A Congruency Effect of Numerical Magnitudes

Zhao Fan, Guomin Jing, Xianfeng Ding, and Xiaorong Cheng

31. Revisiting the Context Effect of Physical Quantity on Reproduced Durations

Stefan Pichelmann and Thomas Rammsayer

32. Robustness of Individual Differences in Temporal Interference Effects

Nadine Schlichting, Hedderik van Rijn, and Ritske de Jong

33. The Mathematical Order Structure of Subjective Time

B. Lungsi Sharma and Richard Wells

MONDAY posters

34. Distinct Roles for Supplementary Motor Area and Feature-specific Regions of the Brain in the Subjective Distortion of Time

Pom Charras and Jennifer Coull

35. Spatial Task Difficulty Modulates Space-Time Interference

Kévin Vidaud Laperrière and Pom Charras

36. Attention from the Start to the End Point Forms Horizontal Mental Timeline

Daichi Yamashiro and Muneyoshi Hyodo

37. Mental Time Lines: Dissociated Mechanisms from Different Ontogenetic Origins?

Xianfeng Ding, Zhongshu Li, Ning Feng, Xiaorong Cheng, and Zhao Fan

38. An Overview of Instantaneous Modulations of Perceived Time

Sarah Maass and Hedderik van Rijn

39. Multitasking and Ad Enjoyment: Does our Perception of Time's Passage Mediate the Relationship between Multitasking and Ad Enjoyment

Shweta Balaji and Aoife McLoughlin

40. Distorted Timing of One's Own Reaction Times in Multitasking Performance

Daniel Bratzke and Donna Bryce

41. Time Estimation Accuracy and Individual Characteristics

Katerina Sedlakova, Adela Beckova, Kristyna Maleninska, Jan Rydlo, Jiri Horacek, and Tereza Nekovarova

42. High Time Contraction in Young Children in Dual-Task Related to their Limited Attention Resources

Quentin Hallez and Sylvie Droit-Volet

43. What's the time? Clock drawing task in patients with cerebral lesions

Rossana Actis-Grosso, Alberta Lunardelli, Giovanna Mioni, and Franca Stablum

44. Deteriorated Millisecond Timing and Deficient Executive Functions in Aging: Evidence on Common Neural Processes

Elzbieta Szelag, Kamila Nowak, Anna Dacewicz, Anna Bombinska, Katarzyna Broczek, Malgorzata Kupisz-Urbanska, and Tadeusz Galkowski

45. Effects of the Manipulation of a Work of Art on Subjective Time in Patients with Parkinson's Disease

José Lino Oliveira Bueno, Márcia Motta, and Vitor Tumas

46. Timing as an Early Cognitive Signature of Alzheimer's Disease

Chasity Chung and Charlotte Bonardi

47. Psychological Time in Mild cognitive Impairment

Sara Coelho, Manuela Guerreiro, Catarina Chester, Dina Silva, Joao Maroco, Miguel Coelho, Fabio Paglieri, and Alexandre de Mendonça

48. Does Time Speed Up When Thoughts Race? The Experience of Time in Adult Attention Deficit/Hyperactivity Disorder And Bipolar Disorder

Luisa Weiner, Anne Giersch, Gilles Bertschy, and Weibel Sebastien

49. Time perception and Autistic Spectrum Condition: A Systematic Review

Martin Casassus, Ellen Poliakoff, Daniel Poole, Emma Gowen, and Luke Jones

50. Time-Based Event Expectancies in Children with Autism Spectrum Disorders

Marina Kunchulia, Tamar Tatishvili, Khatuna Parkosadze, Nino Lomidze, and Roland Thomaschke

51. The Psychopathology of Time and Timing as seen in Major Depressive Disorder and Autism-Spectrum-Disorder

David Vogel and Kai Vogeley

52. From Brain Imaging to Data Collection in Daily Life: Towards an Integrated Understanding of Time Perception in Psychiatric Conditions

Dupuy Maud, Anthony Roy, David Misdrahi, Bernard N'Kaoua, Arnaud Tessier, Alexandra Bouvard, Pierre Schweitzer, Marc Auriacombe, Fuschia Serre, Melina Fatseas, Joel Swendsen, and Micha Pfeuty

MONDAY posters

53. Time Perception and Temporal Processing in Schizophrenia: A Meta-analysis

Sven Thoene and Daniel Oberfeld

54. Borderline or Bipolar? Differences in Time Perception

Shima Talehy-Moineddin

55. Depression can Cause to Time Compression During Emotional Oddball Stimuli

Mahsa Ghaheri and Amirhossein Ghaderi

56. Can Training Induce Changes in Temporal Dynamics of Brain Processes in Two Different Time Integration Windows in Children with Specific Language Impairment?

Anna Dacewicz, Aneta Szymaszek, Kamila Nowak, Anna Bombinska, and Elzbieta Szelag

57. The role of Vision in Time Perception: Evidence from sighted and severely visually impaired children

Tiziana Battistin, Vittorina Schoch, Giovanna Mioni, and Patrizia Bisiacchi

58. Temporal Processing in Patients with Tumor Invading the Supplementary Motor Area Before and After Surgical Resection

Vincent Monfort, Micha Pfeuty, H el ene Brissart, and Fabien Rech

TUESDAY morning at a glance

9:00-10:45

Parallel sessions – Short oral presentations

Salle Pasteur

Temporal Order & Temporal Binding

9:00-10:45

Parallel sessions – Short oral presentations

Amphitheater Viaud

Oscillations & Entrainment

10:45-11:15

Coffee break

11:15-11:45

Plenary session - Salle Pasteur

Sofia Soares

Dopamine Neurons in the Substantia Nigra
Pars Compacta Reflect and Control Temporal
Judgments

11:45-13:00

Parallel sessions – Symposium

Salle Pasteur

Neural Oscillations for Time Estimation

Symposium organiser: Wiener

11:45-13:00

Parallel sessions – Short oral presentations

Amphitheater Viaud

Temporal Learning & Memory

13:00-14:30

Lunch

TUESDAY afternoon at a glance

14:30-15:45

Parallel sessions – Symposium

Salle Pasteur

Timing, Neural Dynamics, and Temporal
Scaling

Symposium organiser: Buonomano

14:30-15:45

Parallel sessions – Symposium

Amphitheater Viaud

Perception: Continuous or Discrete?

Symposium organiser: Herzog

15:45-16:45

Plenary session – Salle Pasteur

Poster blitz

16:45-18:15

Poster session & Coffee

18:00-19:30

Walking Tour

Planned visits at 18:00 onsite !

20:30-...

Gala Dinner

TUESDAY 9am-10.45am

Parallel sessions

Session 1: Short talks

Temporal Order and Temporal Binding (Chair: Virginie van Wassenhove)

Salle PASTEUR

Rapid Recalibration to Audiovisual Asynchronies occurs Unconsciously

Erik Van der Burg (The Netherlands), David Alais, and John Cass

Time Order is a Psychological Bias

Laetitia Grabot (France), Anne Kösem, Leila Azizi, and Virginie van Wassenhove

Reframing Variability in Auditory, Visual, and Audiovisual Timing Tasks: From nuisance to an aid to understand complex systems dynamics

Lars T Boenke (Germany), Richard Höchenberger, David Alais, and Frank W Ohl

Saccadic Temporal Recalibration Leads to a Reversal of Cause and Effect

Brent Parsons (Italy), Dunia Giomo, and Domenica Bueti

Perceived Timing of a Visual Event is Affected by Temporal Context

Ljubica Jovanovic (France) and Pascal Mamassian

Perceived timing of sensory events triggering actions in Parkinson's disease

Yoshiko Yabe (Canada), Penny A. MacDonald, and Melvyn A. Goodale

TUESDAY 9am-10.45am

Parallel sessions

Session 2: Short talks

Entrainment and Oscillations (Chair: Sundeep Teki)

Amphitheater VIAUD

Actively Anticipating Upcoming Tempo Changes Modulates Induced Neural Beta Power

Emily Graber (USA) and Takako Fujioka

Neural Entrainment reflects Temporal Predictions Guiding Speech Comprehension

Anne Kösem (The Netherlands)

Visual to Auditory Entrainment enhances Auditory Gap Detection Performance

Anna-Katharina R. Bauer (Germany), Martin G. Bleichner, Sylvain Baillet, and Stefan Debener

Dynamic Preparation of Temporal and Spatial Features for Skilled Sequence Production (MEG)

K. Kornysheva (UK), D. Bush, S. Meyer, A. Sadnicka, N. Burgess, and G. Barnes

Neuronal Synchrony Mediates the Attention to Time and its Estimation

Shrikanth Kulashekhar (Italy, Finland), Matias J. Palva, and Satu Palva

Anticipation of a Familiar Event is Associated with Widespread Predictive Activation of Sensory Cortical Areas

Dan Lloyd (USA)

TUESDAY 11.15am-11.45am

Keynote lecture : Sofia Soares

Plenary session: Salle Pasteur

Sofia Soares is a graduate student in the lab of Joe Paton at the Champalimaud Centre for the Unknown in Lisbon, Portugal. Sofia obtained her undergraduate degree in molecular biology from the University of Lisbon in 2008, and then joined the Paton lab for her Masters and PhD training. During this time, Sofia has studied the role of basal ganglia nuclei in interval timing behavior. Specifically, her work has shown how population activity in the striatum represents elapsed time, and how this population code scales with the interval being timed. Her recent work has looked into the basis of variability in subjective time estimates, and has shown how midbrain dopamine neurons represent and control subjective judgments of time.



Dopamine Neurons in the Substantia Nigra Pars Compacta Reflect and Control Temporal Judgments

To guide adaptive behavior, animals must select which actions to take and when to perform them depending on the current state of their environment and their past experience. Since the consequences of an action are often delayed, animals must also be able to represent temporal information about when events and actions occur. Our sense of time, however, is not constant.

Midbrain dopamine neurons have been implicated in interval timing. However, a direct link between signals carried by dopamine neurons and temporal judgments is lacking. Additionally, it is unclear whether distinct dopamine neuron subpopulations in the substantia nigra pars compacta (SNc) and in the ventral tegmental area (VTA) carry distinct signals during timing behavior.

In this talk, I will present results from experiments where we measured and manipulated the activity of dopamine neurons in either the SNc or the VTA as mice judged the duration of time intervals. We found that pharmacogenetic suppression of midbrain dopamine neurons decreased behavioral sensitivity to time. Next, we measured dopamine neuron activity in the SNc and found that these neurons encode a reward prediction error signal that reflects both temporal expectation and the expected probability of reward. Furthermore, we observed a horizontal shift of the psychometric curve toward long choices when SNc dopamine neuron activity was low, and the opposite horizontal shift when activity was high. Additionally, we found that transient activation or inhibition of dopamine neurons in the SNc was sufficient to slow or speed time estimation, respectively. Interestingly, dopamine neurons in the VTA did not reflect nor control temporal judgments.

Therefore, our data suggests that dopamine neuron activity in the SNc, but not in the VTA, reflects and can directly control the judgment of time. This difference may, in part, result from the parallel circuit architecture of the basal ganglia. These findings provide a basis for a unifying view of dopamine neuron function in both reinforcement learning and interval timing.

TUESDAY 11.45am-1pm

Parallel sessions

Session 1: Symposium

Neural Oscillations for Time Estimation (Martin Wiener)

Speakers: Nandakumar Narayanan (USA), Tadeusz W. Kononowicz (France), Martin Wiener (USA)

Salle Pasteur

Delta Oscillations and the Starting Gun

Nandakumar Narayanan

Temporal Metacognition as Decoding Self-Generated Brain Dynamics

Tadeusz W. Kononowicz, Clemence Roger, and Virginie van Wassenhove

Causal Role of Beta Oscillations in Time Estimation

Martin Wiener, Alomi Parikh, Arielle Krakow, and H. Branch Coslett

Session 2: Short talks

Temporal Learning & Memory (Chair: Valerie Doyere)

Amphitheater VIAUD

Interaction of Temporal Predictions across Cues, Durations, and Behavioral Systems

Matthew S Matell (USA)

Stimulus and Temporal Control of Behavior

Marcelo S. Caetano (Brazil)

Associate Memory of Elapsed Time: Behavior, Brain Oscillations and Hippocampal Activity

Vincent van de Ven (The Netherlands) Julia Lifanov, Oana Iosif, Sarah Kochs, Fren Smulders, and Peter de Weerd

Interval Timing in Aging Mice

Ezgi Gür (Turkey), Yalçın Akın Duyan, Sertan Arkan, Ayşe Karson, and Fuat Balcı

Temporal Estimation of Familiar Actions in Children and Adults

Anne-Claire Rattat (France) and Valérie Tartasé

TUESDAY 2.30pm-3.45pm

Parallel sessions

Symposium 1

Timing, Neural Dynamics, and Temporal Scaling (Dean Buonomano)

Speakers: Hugo Merchant (Mexico), Mehrdad Jazayeri (USA), Dean Buonomano (USA)

Salle Pasteur

Periodic Neural State Trajectories underlie Rhythmic Tapping

Hugo Merchant

Flexible Temporal Control of Self-Initiated Movements by Speed of Cortical Dynamics

Mehrdad Jazayeri

Temporal Scaling of Complex Temporal Patterns in a Recurrent Neural Network Model and Humans

Dean Buonomano

Symposium 2

Perception: Continuous or Discrete? (Michael Herzog & Adrien Doerig)

Speakers: Rufin VanRullen (France), Michael Herzog (Switzerland), Tomer Fekete (Belgium)

Amphitheater Viaud

Perceptual Cycles

Rufin VanRullen

Two steps: Quasi-Continuous Unconscious Processing and Discrete Conscious Perception

Michael Herzog and Adrien Doerig

For the Sake of Maintaining Continuity

Tomer Fekete and Cees van Leeuwen

TUESDAY 3.45pm-4.45pm BLITZ

Plenary session – Room Pasteur

POSTER BLITZ

**The Fate of Temporal Expectations in Noisy Environments:
Robust Extraction of Temporal Regularities is Limited to
Multisensory Events**

Felix Ball, Lara Michels, and Toemme Noesselt

**On the Stability of Temporal Reference Information in
Duration Discrimination**

Ruben Ellinghaus, Karin Bausenhardt, and Rolf Ulrich

**The influence of Temporal Predictability on Response
Inhibition**

Inga Korolczuk, Boris Burle, and Jennifer Coull

Intention and Prediction in Time Perception

Mukesh Makwana and Narayanan Srinivasan

**Activity of Cholinergic Interneurons in the Primate Striatum
during a Time Estimation task**

Anne-Caroline Martel and Paul Apicella

**Decoding the Representation of Time in Brain States using
Multivariate Pattern Analysis**

Vanessa Morita, Fernanda Bueno, Raphael de Camargo,
Marcelo Reyes, Marcelo S. Caetano, and Andre Cravo

**An Intracranial Electroencephalography Investigation of the
Supplementary Motor Area in the Reproduction of Supra-
Second Time Intervals**

Micha Pfeuty, Vincent Monfort, Madelyne Klein, Julien Krieg,
Steffie Collé, Jean-Pierre Vignal, Jacques Jonas, and
Louis Maillard

**Cortical Network for Internal Representation of Rhythmic
Stimulus**

Eduardo Rojas-Hortelano

**Causality as the Determinant Factor for Intentional Binding in
Naturalistic Event Sequences**

Vassilis Thanopoulos and Argiro Vatakis

TUESDAY 3.45pm-4.45pm BLITZ

Plenary session – Room Pasteur

Dynamic Prosodic Features in Bipolar Disorder: How Shifting Vocal Patterns in Verbal Fluency Tasks Can Aid the Detection of Mixed Symptoms

Luisa Weiner, Nicola Vanello, Andrea Guidi, Enzo Pasquale Scilingo, Nadège Doignon-Camus, Gilles Bertschy, and Anne Giersch

The Timing Mechanism in the Hundreds of Milliseconds is Disrupted by a D2 Agonist

Karyna Yc

NOTES

POSTER SESSION 4.45pm-6.15pm In the hall: Ground floor

- 1. Intentional Binding as a Function of Action-Effect Interval and Semantic Relatedness**
Penelope Bounia, Vassilis Thanopoulos, and Argiro Vatakis
- 2. Intentional Binding of Visual Effects**
Andrea Kiesel, Miriam Ruess, and Roland Thomaschke
- 3. Intentional Binding of Two Effects**
Miriam Ruess, Roland Thomaschke, Carola Haering, Dorit Wenke, and Andrea Kiesel
- 4. Causality as the determinant factor for Intentional Binding in naturalistic event sequences**
Vassilis Thanopoulos and Argiro Vatakis
- 5. A Motor Recalibration Influence on Color-Motion Asynchrony Effect Size in a Visuo-Motor Paradigm**
Melisa Kurtcan
- 6. Electrophysiological Correlates of Audiovisual Recalibration**
Renan Recio, Andre Cravo, and Raphael de Camargo
- 7. Time Perception for Simple Stimuli: Effect of Inter-and Intra-modal Stimulus Characteristics**
Vicky Karadima, Maria Stamatelou, and Argiro Vatakis
- 8. Are There Modality-Specific Effects of Preceding Flicker and Flutter on the Reproduction of Visual and Auditory Duration**
Karin Bausenhardt and Maria De la Rosa
- 9. The Effect of Modality Congruency in Isochronous Sequences**
Min Li and Massimiliano Di Luca
- 10. Modality Differences in Timing: Testing the Pacemaker Speed Explanation**
Emily Williams, Andrew Stewart, and Luke Jones
- 11. On the Stability of Temporal Reference Information in Duration Discrimination**
Ruben Ellinghaus, Karin Bausenhardt, and Rolf Ulrich

12. Imagined Stimulus Size Influence Duration Judgments in the Same Way as Physical Stimulus Size Does?

Rolf Ulrich

13. Non-Gaussian Representation of the Subjective Time

Marcelo Reyes, Tomás Aquino, and Raphael de Camargo

14. The Neuroscience of Apparent Motion: Towards a Theory of Temporal Experience

Matthew Piper

15. Demixing the Perception of Duration and Intensity in Vibrotactile Behavior

Alessandro Toso, Arash Fassihi, Francesca Pulecchi, Sara Sorella, and Mathew E. Diamond

16. Constructing the Perceived Unity of Time

Gerardo Viera

17. Unified Mechanism for Simultaneous Processing of Physical Properties and Subsecond Time Parameters of Sensory Stimuli in the Same Neural Circuit

Isabella Silkis

18. Integrating Temporal Control Models on the Grounds of a Computational Architecture

Estêvão Bittar and José Lino Oliveira Bueno

19. Using Time to Enhance Fluent Human-Robot Interaction

Michail Maniadakis and Panos Trahanias

20. It's About Time: Examining the Concept of Temporality In Information System Development

Mairead O' Connor and Kieran Conboy

21. The Haptic of Time

Luca Ferraro and Laura Rossi

22. Time Perception in Human-Computer Interaction: the Role of Duration Perception and Passage of Time in User Experience

Anna Trapp

23. Decisional, Attentional and Working Memory Mechanisms in Generalisation and Bisection Tasks: An ERP Study

Dorian Banner, Robert Lalonde, and Mohamed Rebaï

24. Decoding the Representation of Time in Brain States using Multivariate Pattern Analysis

Vanessa Morita, Fernanda Bueno, Raphael de Camargo, Marcelo Reyes, Marcelo S Caetano, and Andre Cravo

25. An Intracranial Electroencephalography Investigation of the Supplementary Motor Area in the Reproduction of Supra-Second Time Intervals

Micha Pfeuty, Vincent Monfort, Madelyne Klein, Julien Krieg, Steffie Collé, Jean-Pierre Vignal, Jacques Jonas, and Louis Maillard

26. Dissociable Neural Substrates for Internally-Based and Externally-Cued Timing: A Meta-Analytic Review of Functional Neuroimaging Studies

Alice Teghil, Maddalena Boccia, Fabrizia D'Antonio, Antonella Di Vita, Carlo de Lena, and Cecilia Guariglia

27. Investigating the Different Role of Parietal and Frontal Areas in Temporal Processing using Non-Invasive Brain Stimulation Techniques: A Study with tRNS

Giovanna Mioni, Diletta Amoroso, Simon Grondin, and Franca Stablum

28. Roles of Cortical and Sub-Cortical Pathways on Time Perception: A Case Study with Agenesis of the Corpus Callosum

Yuko Yotsumoto, Miku Okajima, Akinori Futamura, Motoyasu Honma, and Mitsuru Kawamura

29. Activity of Cholinergic Interneurons in the Primate Striatum During a Time Estimation task

Anne-Caroline Martel and Paul Apicella

30. Dorsal Striatum Inactivation Disrupts Temporal Discrimination, but not Tone Frequency Discrimination in a Bisection Task

Taisuke Kamada and Toshimichi Hata

31. Role Of Temporal Prediction Error on Triggering Plasticity in Amygdala Nuclei in an Appetitive Conditioning

Tatiane Ferreira Tavares, Jose Lino Oliveira Bueno, and Valérie Doyère

32. Medial Prefrontal Cortex Activity of Rats in the Differential Reinforcement Response Duration Task

Gabriela Chiuffa Tunes, Eliezyer F. de Oliveira, Marcelo S. Caetano, and Marcelo B. Reyes

33. Study of the Duration Discrimination Task and the Shift of Bisection Point in Rats

Shogo Sakata and Yuta Nakamura

34. Development of Schedule-induced Drinking in the Bi-peak Procedure

Gabriela López-Tolsa and Ricardo Pellón

35. Proprioceptive Timing mediates Switch Behavior in CD-1 Mice

Anna Roselle and J. Mark Cleaveland

36. Embodied Learning of Time Intervals

Elizabeth Thomas, Robert French, Lilian Fautrelle, and Jennifer Coull

37. Embodied or “Embrained” Temporal Precision?

Leon van Noorden

38. Intention and Prediction in Time Perception

Mukesh Makwana and Narayanan Srinivasan

39. Temporal and Spatial Attention in Touch

Alexander Jones

40. Paying Attention to Time is Faster than Paying Attention to Space

Yaffa Yeshurun and Shira Tkacz-Domb

41. Electrophysiological Correlates of Spatial Attention and Rhythms in Sensory Processing

Louise Barne, Floris de Lange, and André Cravo

42. Can Multivariate Pattern Analysis Help Us Understand How Time is Encoded?

André Cravo

43. The influence of Temporal Predictability on Response Inhibition

Inga Korolczuk, Boris Burle, and Jennifer Coull

44. Disentangling between Voluntary and Automatic Temporal Orienting: A high Spatial-resolution ERP Study

Giovanni Mento

45. Time, Prediction and Minimal Self in Schizophrenia

Brice Martin, Jennifer Coull, Michel Cermolacce,
Nicolas Franck, and Anne Giersch

46. Cortical Network for Internal Representation of Rhythmic Stimulus

Eduardo Rojas-Hortelano and Víctor de Lafuente

47. Motor Synchronization in Schizophrenia: Preserved Rhythmic Representation with Abnormalities in Predictive Timing

Hélène Wilquin, Yvonne Delevoye-Turrell, and Anne Giersch

48. Separating Spatial and Interval-timing Strategies on a Rotating Arena: Animal Model of Schizophrenia

Kristyna Maleninska, Pavla Jandourkova, Tereza Nekovarova,
and Ales Stuchlik

49. The Timing Mechanism in the Hundreds of Milliseconds is Disrupted by a D2 Agonist

Karyna Yc

50. Comparing Human and Nonhuman Primate Brain Responses to Auditory Sequences Using EEG

Daniel Cameron, Luis Prado, Jessica Grahn, and
Hugo Merchant

51. No Evidence For Improved Attention Towards Implicit Temporal Regularities

Atser Damsma, Ritske de Jong, Niels Taatgen, and
Hedderik van Rijn

52. The Effects of Rhythm-Induced Attention on Perceptual Representation – Mixture-Model Analysis

Asaf Elbaz and Yaffa Yeshurun

53. Discrimination Accuracy for Visual Rhythms surprisingly Independent on Several Perceptual Factors

Maria Zimmermann and Maksymilian Korczyk

54. On-Beat Presentation and Foreperiod Effects in Audio-Visual Rhythmic Entrainment

Renaud Brochard and Arnaud Leleu

TUESDAY POSTERS

- 55. The Fate of Temporal Expectations in Noisy Environments: Robust Extraction of Temporal Regularities is Limited to Multisensory Events**
Felix Ball, Lara Michels, and Toemme Noesselt
- 56. Moving and Multisensory Stimulation for Enhancing Visual Rhythm Perception**
Nadia Paraskevoudi and Argiro Vatakis
- 57. Temporal and Identity Predictions shape Sensory Responses to Sound in Interaction with Attention**
Fleur Bouwer, Heleen Slagter, and Henkjan Honing
- 58. Why Can't we Perceive Whisper Speech from a Distance Compared to Normal Speech?**
Sudarsana Reddy Kadiri and Suryakanth Gangashetty
- 59. Dynamic Prosodic Features in Bipolar Disorder: How Shifting Vocal Patterns in Verbal Fluency Tasks Can Aid the Detection of Mixed Symptoms**
Luisa Weiner, Nicola Vanello, Andrea Guidi, Enzo Pasquale Scilingo, Nadège Doignon-Camus, Gilles Bertschy, and Anne Giersch
- 60. Rhythm, Harmony and Musical Training Interact to Affect the Sensation of Groove as well as Activation in Motor and Reward Areas**
Tomas Matthews, Maria Witek, Ole Heggli, Torben Lund, Virginia Penhune, and Peter Vuust
- 61. Drum-Playing modulates the Post-Auricular Muscle Response**
Patrick Simen and Zoe Swann
- 62. Mapping the Beat Bin: Effects of Rise Time, Duration and Frequency Range on the Perceived Timing (P-center) of Musical Sounds**
Anne Danielsen, Justin London, and Kristian Nymoen
- 63. Exploring the Neural Basis of Musical Timing not Related to a Regular Beat**
Erik Christensen
- 64. Rhythmic Perceptual Priors Revealed by Iterated Reproduction**
Nori Jacoby and Josh McDermott
- 65. In Search of Differential Enculturation and Entrainment Effects in Rhythmic Grouping**
Ece Kaya and Esra Mungan

TUESDAY POSTERS

66. Collective Metacognition in Improvised Music Ensemble

Pedro Barreiros and Renato Soeiro

67. Human Speed in Music

Ned McGowan

68. Is this Music, the Extraordinary Nature of a Single Drumming Bout Compared to Ordinary Noise Making in Chimpanzees

Valérie Dufour, Cristian Pasquaretta, and Elisabeth HM Sterck

NOTES

WEDNESDAY morning at a glance

9:00-10:00

TRF Business meeting - Salle Pasteur - open to all

10:00-11:00

Parallel sessions – Short oral presentations

Salle Pasteur

Rhythms & Prediction in Pathology

10:00-11:00

Parallel sessions – Short oral presentations

Amphitheater Weiss

The Internal Clock? Models & Neurochemistry

11:00-11:15

Coffee break

11:15-12:30

Parallel sessions – Symposium

Salle Pasteur

Temporal Binding of Actions to their Effects:

Underlying Mechanisms and Implications for

Cognition, Perception, and Development

Symposium organisers: Buehner & McCormack

12:00-13:15

Parallel sessions – Symposium

Amphitheater Weiss

Temporal Prediction: Dynamics in Single Neurons

and Networks

Symposium organiser: Matell

12:30-13 :30

Lunch

WEDNESDAY afternoon at a glance

14:00-14:30

Plenary session - Salle Pasteur

Warren Meck

Functional and Neural Mechanisms of Interval Timing

14:30-15:45

Parallel sessions – Symposium

Salle Pasteur

Listen to your Heart: Our Inner Perception and Experience of Time

Symposium organisers: Cellini & Mioni

14:30-15:45

Parallel sessions – Symposium

Amphitheater Weiss

Circadian Rhythms in Health and Disease

Symposium organiser: Simonneaux

15:45-16:15

Coffee break

16:15-17:30

Parallel sessions – Symposium

Salle Pasteur

Timing and Time Perception in Children

Symposium organiser: Droit-Volet

16:15-17:30

Parallel sessions – Symposium

Amphitheater Weiss

Embodied Timing: The Role of Emergent and Predictive Timing Mechanisms in the Voluntary Control of Whole Body Movements

Symposium organiser: Delevoye-Turrell

17:30-17:45

Close

WEDNESDAY 9am-10am
TRF Business meeting – Open to all

Salle Pasteur

Sundee Teki - Introduction to TRF
Anne Giersch - Organizer's perspectives
TRF 2018 Announcement
Q&A

NOTES

WEDNESDAY 10.00am-11:00am

Parallel Sessions

Session 1: Short talks

Rhythms & Predictions in Pathology (Chair: Andre Cravo)

Salle Pasteur

Selective Impairment of Temporal versus Spatial Predictive Coding in Schizophrenia

Valentina Ciullo (Italy) Federica Piras, Gianfranco Spalletta, and Jennifer T. Coull

Spared Synchronization to the Beat of Music in the Presence of Poor Beat Perception

Valentin Bégel (France), Charles-Etienne Benoit, Angel Correa, Diana Cutanda, Sonja A. Kotz, and Simone Dalla Bella

Musical Rhythmic Training and Conversational Temporal Skills in Children with Deafness

Céline Hidalgo (France), Simone Falk, Noël Nguyen, and Daniele Schön

The Role of Timing in Automatic Processing of Speech at Sub-Lexical and Lexical Levels

Anita E. Wagner (The Netherlands) and Deniz Başkent

WEDNESDAY 10.00am-11:00am

Parallel Sessions

Session 2: Short talks

The Internal Clock? Models & Neurochemistry (Chair: Jennifer Coull)

Amphitheater Weiss

A Functioning Model of Human Time Perception

Warrick Roseboom (UK), Zafeirios Fountas, Kyriacos Nikiforou, David Bhowmik, Murray Shanahan, and Anil Seth

Resolving the Dopamine Paradox in Interval Timing: How a Phasic Dopamine Release can Reset the Clock, whereas Tonic Dopamine Fluctuations alter Perceived Time

Hedderik van Rijn (The Netherlands), Pim Mostert, Michael LeKander, Pedro A. Martinez-Mediano, and Zafeirios Fountas

Excitation/Inhibition Balance in Cerebellum and Putamen Predict Individual Differences in Interval Timing

Devin B. Terhune (UK)

Dopaminergic Modulation of Time Perception: A Biophysical Model

Joachim Hass (Germany)

Symposium 1

Temporal Binding of Actions to their Effects: Underlying Mechanisms and Implications for Cognition, Perception, and Development (Marc Buehner & Teresa McCormack)

Speakers: Marc Buehner (UK), Sara Lorimer (UK), Christoph Hoerl (UK)

Salle Pasteur

Temporal Binding and Internal Clocks

Marc Buehner

When Causality Shapes the Experience of Time

Sara Lorimer, and Emma Blakey

Temporal Binding and the Perception/Cognition Boundary

Christoph Hoerl

Symposium 2

Temporal Prediction: Dynamics in Single Neurons and Networks (Matthew Matell)

Speakers: Krystal Parker (USA), Joseph Paton (Portugal), Valerie Doyere (France), Dean Buonomano (USA)

Amphitheater Weiss

An Essential Role for the Cerebellum in Suprasecond Timing

Krystal L. Parker

Basal Ganglia Contributions to a Time-Based Decision

Joseph J. Paton

An Amygdala-Striatal Network for Temporal Expectation of an Aversive Stimulus

Valérie Doyère

Timing is An Intrinsic Computation of Neural Circuits

Dean V. Buonomano

WEDNESDAY 2pm-2.30pm

Keynote Lecture: Warren Meck

Plenary session: Salle Pasteur

Warren Meck is a professor of psychology and neuroscience at Duke University. His research is focused on the behavioral,



pharmacological, and electrophysiological aspects of time perception.

He has been involved in the development of an information-processing model of interval timing (Scalar Timing Theory), a mode-control theory of timing and counting, and a neurobiological model of interval timing (Striatal Beat Frequency model). In

recognition of this work, Prof. Meck has received an Alfred P. Sloan Foundation Research Fellowship in Neuroscience and a James McKeen Cattell Sabbatical Award. He is a founding co-editor of the sister journals *Timing & Time Perception* and *Timing & Time Perception Reviews*.

Functional and Neural Mechanisms of Interval Timing

The ability of the brain to process time in the seconds-to-minutes range is a fascinating problem given that the basic electrophysiological properties of neurons operate on a millisecond time scale. Neuropsychological studies of humans and other animals with damage to the basal ganglia have indicated that these structures play an important role in timing and time perception. Parkinson's disease patients, for example, show evidence of a slowed internal clock and the "coupling" of durations stored in temporal memory when tested off of their dopaminergic medication. These studies have shown that the normal cognitive functions of the basal ganglia are heavily dependent upon dopamine-regulated neuronal firing in the cortex and striatum. Moreover, the electrophysiological properties of striatal medium spiny neurons within the basal ganglia suggest that these neurons may serve as coincidence detectors of cortical and thalamic oscillatory input in order to provide the basis for duration discrimination in the seconds-to-minutes range. Recent findings obtained from ensemble recording in the prefrontal/cingulate cortex and the anterior dorsal striatum of rats performing in peak-interval timing procedures indicate that striatal neurons are able to encode specific durations in their firing rate in a "perceptron-like" manner. These findings correspond well with fMRI data obtained from human participants performing similar timing tasks and lend support to the striatal beat-frequency model of interval timing

WEDNESDAY 2.30pm-3.45pm

Parallel sessions

Symposium 1

Listen to your Heart: Our Inner Perception and Experience of Time (Nicola Cellini & Giovanna Mioni)

Salle Pasteur

Speakers: Marc Wittmann (Germany), Nicola Cellini (Italy), Alexandre C. Fernandes (Portugal), Olga Pollatos (Germany)

Waiting through Time: How the Bodily Self Shapes the Experience of Time

Marc Wittmann

Cardiac Activity Modulates Temporal Perception

Nicola Cellini and Giovanna Mioni

Spontaneous Facial Muscle Activity Predicts Duration Estimation

Alexandre C. Fernandes and Teresa Garcia-Marques

Perception of Time and Body Awareness

Olga Pollatos

Symposium 2

Circadian Rhythms in Health and Disease (Valérie Simonneaux)

Speakers: Claude Gronfier (France), Etienne Challet (France), Fabien Pifferi (France)

Amphitheater Weiss

Circadian Rhythms and Metabolism

Etienne Challet

Sleep and Biological Rhythms: It's a Matter of Time!

Claude Gronfier

Is Biological Clock at the Core of Aging Process? Contributions from a Photoperiodic Non-Human Primate

Fabien Pifferi

Symposium 1

Embodied Timing: The Role of Emergent and Predictive Timing Mechanisms in the Voluntary Control of Whole Body Movements (Yvonne Delevoe-Turrell)

Speakers: Juliane J. Honisch (UK), Yvonne Delevoe-Turrell (France), Pieter-Jan Maes (Belgium), Simone Dalla Bella (France)

Salle PASTEUR

Cue Properties Change Timing Strategies in Group Synchronisation

Juliane J. Honisch, Mark T. Elliott, Nori Jacoby, and Alan M. Wing

When your Movements Betray your Feelings: Reading Emotional States Through the Analysis of Spontaneous 3D Dynamics of whole Body Motion

Yvonne Delevoe-Turrell and Daniel Lewkowicz

Enhancing Spontaneous Synchronization of Cyclists' Pedal Cadence to External Music, Through Sonification of Motor Rhythms

Pieter-Jan Maes, Valerio Lorenzoni, and Joren Six

Predicting Individual Response to Rhythmic Auditory Cueing in Parkinson's Disease

Simone Dalla Bella, Valérie Cochen de Cock, Dobromir Dotov, Sophie Bayard, Christian Geny, Petra Ihalainen, and Benoît Bardy

Symposium 2

Timing and Time Perception in Children (Sylvie Droit-Volet)

Speakers: Sylvie Droit-Volet (France), Florie Monier (France), Laurence Casini (France)

Amphitheater WEISS

Different Developmental Trajectories for Different Time Judgments

Sylvie Droit-Volet

Action Helps Young Children Maintain a Robust Representation of Time in Memory

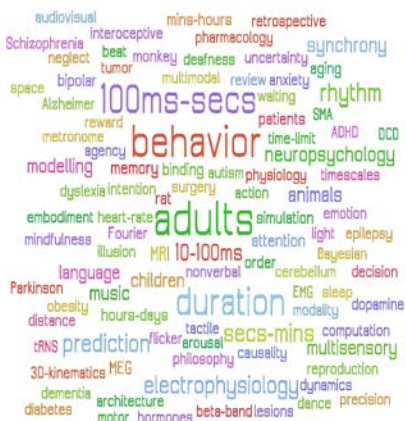
Florie Monier, Sylvie Droit-Volet, and Jennifer Coull

Time, Speech, and Dyslexia

Laurence Casini



TIMING RESEARCH FORUM



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