



## COGNITIVE, NEURAL AND EVOLUTIONARY MECHANISMS IN NUMB3R PROCESSING



19<sup>th</sup> & 20<sup>th</sup> September 2024, Padova, Italy



DIPARTIMENTO DI  
PSICOLOGIA GENERALE

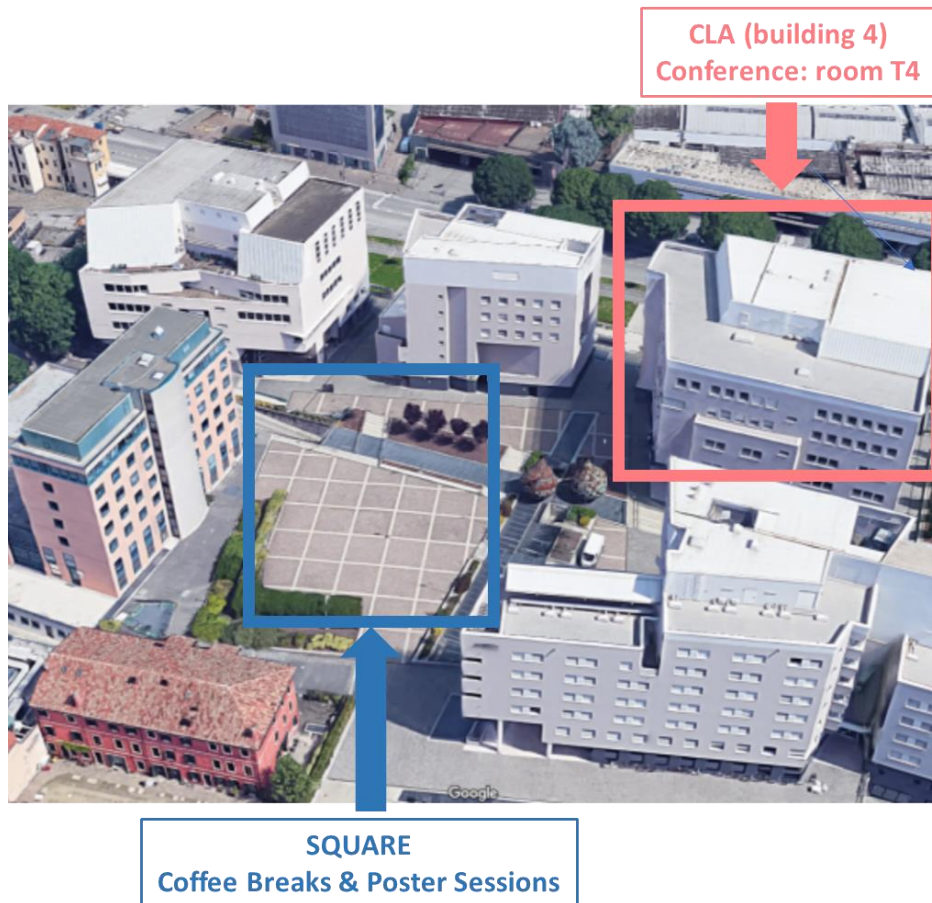


UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

# Location: The school of Psychology of UNIPD

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- **Welcome and Conference: room T4 at CLA** – *Centro Linguistico dell’Ateneo*, building 4 (ground zero); entrance: via Venezia 16
- **Coffee breaks and poster sessions: main square** – Please note that in case of rain the poster sessions will take place in room 2D at CLA (2<sup>nd</sup> floor).
- **How to reach the school of Psychology by bus:** the closest bus stop is named “Ex Fiat”
- **How to reach the school of Psychology by car:** there are parking possibilities in the surrounding streets or here:  
<https://www.padovacentroparking.it/en/>



# Day 1 - Thursday 19<sup>th</sup> of September

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## 8:30-9:30 Registration and opening

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## 9:30-11:00 Session 1 - Grounding numerical cognition

- **9:30-10:00 Giovanni Anobile** (University of Florence), I. Petrizzo, G.M. Cicchini, & D.C. Burr  
*Psychophysical evidence for a generalized sensorimotor number system*
  - **10:00-10:20 Marco Bertamini** (University of Padova)  
*Phenomenology, Quantity, and Numerosity*
  - **10:20-10:40 Attila Krajcsi** (Eötvös Loránd University), K. Brosche, & P. Koujharova  
*The various sources of distance and size effects*
  - **10:40-11:00 Silvia Guerra** (University of Padova), U. Castiello & K. McCrink  
*At the roots of the numerical cognition: the case of pea plants*
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## 11:00-11:30 Coffee break

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## 11:30-13:00 Session 2 - From adaptation to computation

- **11:30-12:00 Roberto Arrighi** (University of Florence), E. Castaldi, D.C. Burr & G. Anobile  
*Numerosity adaptation as an essential tool to investigate numerosity perception, we are not barking up at the wrong tree*
- **12:00-12:20 Evelyn Eger** (INSERM Cognitive Neuroimaging Unit), T. Chapalain, & B. Thirion  
*Numerosity information invariant to object and scene characteristics in biologically inspired neural networks*
- **12:20-12:40 Alberto Testolin** (University of Padova) & M. Zorzi  
*Visual Enumeration is Challenging for Large-scale Generative AI*
- **12:40-13:00 Marco Zorzi** (University of Padova)  
*Modeling the interplay between numerosity and continuous magnitudes: from psychophysics to deep neural networks*

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## 13:00-14:00 Lunch

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## 14:00-15:00 Poster session 1

- **Paula Maldonado** (University of Trento), R. Bonafini, M. G. Mulas, C. Beltrame, D. Basso, L. Zamarian, & M. Piazza  
*Exploring resting-state connectivity changes following short-term arithmetic learning*
- **Sara Lo Presti** (University of Rome), M. Mauti, M. D'Olica, S. Lozito, M. Martelli, S. Lasaponara, & F. Doricchi  
*No spatially congruent gaze shifts during number magnitude comparison: a high resolution eye tracker study*
- **Irene Petrizzo** (University of Trento), M. Pellegrino, G. Anobile, F. Doricchi, & R. Arrighi  
*Top down determinants of the numerosity–time interaction*
- **Mauro Murgia** (University of Trieste), A. Ielo, F. Sors, S. Pileggi, V. Prpic, T. Agostini, & C. Craig  
*Number magnitude affects walking direction in a virtual reality setting*
- **Michal Pinhas** (Ariel University), A. Feder, & Y. Graithzer  
*Symbolic representations of infinity*
- **Serena Mingolo** (University of Trieste), M. Murgia, A. Mariconda, T. Agostini, & V. Prpic  
*Both pseudoneglect and frequency of use contribute to the small number bias in random number generation.*
- **Paola Cazzol** (University of Padova), P. Ahookhosh, A. Porru, L. Ronconi, D. Lucangeli, L. Regolin, S. Benavides-Varela, & R. Rugani  
*Symbolic and Non-Symbolic numbers differently affect center identification in a number-line bisection task*
- **Cemre Karadeniz** (University of Padova), M. Ranzini, S. Betti, & L. Sartori  
*Understanding numerical cognition through the sensorimotor system: The effect of hand actions on magnitude and order processing*
- **Maria Silvia Sacconi** (University of Padova), V. Livoti, & M. Bonato  
*Studying fractions from a cognitive perspective: A review*
- **Marco Turi** (University of Salento), E. Castaldi, P. Angelelli, M. Baroncini, G. Maduli, M. Marazzi, G. Anobile  
*Geometrical and emotional difficulties in individuals with learning disabilities*
- **Ying Yang** (University of Louvain), M. Fornaciai, I. Togoli, I. Shahzad, A. Van Audenhaege, F. Cerpelloni, & O. Collignon  
*Brain regions representing numerosity across the senses and presentation format*
- **Laura Danesin** (IRCCS San Camillo Hospital), G. Baron, M. Ranzini, A. Menardi, G. Bottini, A. Vallesi, C. Semenza, & F. Burgio  
*Financial abilities: unveiling numerical correlates and anatomical insights in stroke patients*



- **Kuinan Hou** (University of Padova), & A. Testolin  
*Estimating the distribution of numerosity and non-numerical magnitudes in naturalistic visual scenes using computer vision*
  - **Isabel Beatrice Marc** (University of Rome), V. Giuffrida, S. Ramawat, F. Di Bello, S. Ferraina, & E. Brunamonti  
*Saccadic behavior provides evidence on spatially oriented mental representation of rank-ordered symbols in monkeys performing a transitive inference task*
  - **Giulia Cherubini** (University of Padova), G. Scafora, A. Porru, S. Benavides, S. Caviola, P. Rigo, M. Lunghi, V. Liani, R. Polli, E. Bettella, A. Murgia, & E. Di Giorgio  
*Mathematical outcomes relate to activation ratio in x-fragile syndrome: two case-studies*
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### **15:00-16:30 Session 3 - Cognitive and neural mechanisms of spatial-numerical associations**

- **15:00-15:30 Valter Prpic** (University of Bologna), A. Mariconda, S. Pileggi, S. Mingolo & M. Murgia  
*Neural overlap hypothesis and automaticity of number processing: the case of Spatial-Numerical Associations*
  - **15:30-15:50 Fabrizio Doricchi** (Sapienza University, Rome)  
*No Attentional SNARC with magnitude processing in left-to-right counters.*
  - **15:50-16:10 Stefano Lasaponara** (Sapienza University, Rome), M. Pinto, S. Lozito, G. Scozia, M. Pellegrino, S. Lo Presti, S. Gazzitano, F. Giove, & F. Doricchi  
*Changes in brain functional connectivity underlying the Space Number Association (SNA)*
  - **16:10-16:30 Jochen Laubrock** (University of Potsdam)  
*Hemispheric and linguistic influences on nonsymbolic numerosity judgments*
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### **16:30-17:00 Coffee break**

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### **17:00-18:30 Session 4 - Number processing in the resting, working, or injured brain**

- **17:00-17:20 Carlo Semenza** (Padova Neuroscience Center), M. Varkanitsa, S. Kiran, & E. Salillas  
*Aphasics' errors in single-digit multiplication*
- **17:20-17:40 Jan-Willem Koten** (University of Graz)  
*Reliable spillover effects in the resting and working brain*

- **17:40-18:00 Emiliano Brunamonti** (Sapienza University, Rome), S. Ramawat, I.B. Marc, F. Di Bello, & S. Ferraina  
*Evidence for a neuronal substrate of non-symbolic numerical representations in the prefrontal cortex of monkey*
  - **18:00-18:20 Michele Fornaciai** (Université Catholique de Louvain), O. Collignon, D. Bueti, & I. Togoli  
*The mechanisms and neural signature of average numerosity perception over time*
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## Day 2 - Friday 20th of September

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### 9:00-11:00 Session 5 - Arithmetic operation and temporal duration

- **9:00-9:30 Oliver Lindemann** (Erasmus University Rotterdam)  
*Tracking Mental Arithmetic*
- **9:30-9:50 Claudia Gianelli** (University of Messina), M. Milanese, N. Canessa, F. Rossato, & K. Kühne  
*The effect of inhibitory control and sleep quality on the operation sign spatial association in first-wave COVID-19 patients*
- **9:50-10:10 Enrica Donolato** (University of Oslo), S. Caviola, S. Rossi, A. Moè, & I. C. Mammarella  
*Exploring the impact of value appraisal and emotions on children's mathematical performance*
- **10:10-10:30 Irene Togoli** (Université catholique de Louvain), M. Fornaciai, S. Binisti, & O. Collignon  
*The emergence and calibration of magnitude integration between numerosity and duration*
- **10:30-10:50 Mario Bonato** (University of Padova), M. Vencato, & M. Zorzi  
*Temporal momentum: an online replication and beyond*

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### 11:00-11:30 Coffee break

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### 11:30-13:00 Session 6 - The *cardinal* role of number discrimination and finger configurations

- **11:30-11:50 Kimberly Broche** (University of Padova), L. Regolin, A. Zazio, & R. Rugani  
*Numerical Discrimination Strategies in Chicks – A Matter of Individuality*
- **11:50-12:10 Silvia Benavides-Varela** (University of Padova), N. Reoyo-Serrano, A. Dimakou, C. Nascimben, T. Bastianello, & D. Lucangeli  
*Infants flexibly engage precise and approximate representations when processing multiple syllables*
- **12:10-12:30 Catherine Thevenot** (University of Lausanne), & M. Krenger  
*Assessing the cardinality principle with the How-many task in young children*

- **12:30-12:50 Marco Fabbri** (University of Campania)  
*Canonical Finger Numeral Configuration, Starting Hand, and Numerical Processing*
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## 13:00-14:00 Lunch

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## 14:00-15:00 Poster session 2

- **Orsola Rosa Salva** (University of Trento), E. Eccher, C. Chiandetti, & G. Vallortigara  
*Numerical auditory processing and cross-modal matching in domestic chicks*
- **Emma Visibelli** (University of Padova), G. Vigna, C. Nascimben, & S. Benavides-Varela  
*Neurobiology of numerical learning*
- **Matteo Macchinizzi** (University of Padova), Y Zhang, L. Regolin & R. Rugani  
*Counting on lateralization: Spatial-numerical associations in new-born domestic chicks (*Gallus gallus*)*
- **Luna Dudine** (University of Padova), K. Brosche, R. Rugani, L. Regolin, S.E Benavides Varela, & A. Porru  
*Encoding zero in an arithmetic task*
- **Celine Poletti** (University of Lausanne), & C. Thevenot  
*A longitudinal study on the development of groupitizing abilities in kindergarten children*
- **Mine Avcil** (University of Tuebingen), & C. Artemenko  
*Development of arithmetic across the lifespan*
- **Magali Dumureau** (UniDistance Suisse), M. Hartmann & C. Thevenot  
*Exploring Spatial-Numerical Associations in Early Development: Vertical SNA in babies*
- **Giulia Vigna** (University of Padova), A. Porru, D. Lucangeli, & S. Benavides-Varela  
*The association between fingers' usage and early numerical skills in toddlers*
- **Francesca Tinelli** (IRCCS Fondazione Stella Maris), E. Castaldi, M. Bartoli, F. Gasperini, & G. Anobile  
*Auditory time perception in children with developmental dyscalculia*
- **Matthias Hartmann** (UniDistance Suisse), & M. Dumureau  
*Anodal high-definition transcranial direct current stimulation over the left (but not right) parietal cortex facilitates mental arithmetic*
- **Petia Kojouharova** (ELTE Eötvös Loránd University), D. Kuznetsova, P. Hristova, & A. Krajcsi  
*Grammatical gender interferes with numerical magnitude*
- **Simone Cutini** (University of Padova), & M. Ranzini  
*Functional near-infrared spectroscopy (fNIRS): a suitable tool to investigate embodied number processing across the lifespan*
- **Annamaria Porru** (University of Padova), E. Visibelli, D. Lucangeli, B. Butterworth, & S. Benavides-Varela  
*Neural indicators of numerical abilities in the infant human brain: a systematic review*



- **Elisa Straulino** (University of Padova), R. Rugani, S. Benavides-Varela, S. Filippetti, & L. Sartori  
*Kick the number: A kinematic approach to number processing in children*
  - **Marie Krenger** (University of Lausanne), & Catherine Thevenot  
*Examining the relation between counting principle knowledge and finger calculation*
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## **15:00-16:30 Session 7 - Evolutionary mechanisms of spatial-numerical associations**

- **15:00-15:20 Elena Eccher** (University of Trento), M. Josserand, S. Caparos, E. Boissin, M. Buiatti, M. Piazza, & G. Vallortigara  
*A universal left-to-right Space-Number Association across ages and cultures*
  - **15:20-15:40 Michele Vicovaro** (University of Padova), A. Spoto, & M. Dalmaso  
*SNARC effect reliability: A comparative analysis of parity judgment and magnitude comparison tasks*
  - **15:40-16:00 Arianna Felisatti & Rosa Rugani** (University of Padova)  
*The peculiar link between numerosity and space: Insights from animal models*
  - **16:00 16:30 Martin H. Fischer** (University of Potsdam), & **Samuel Shaki** (Ariel University)  
*On the embodied nature of knowledge: From neurons to numbers*
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## **16:30-17:00 Conclusive remarks**

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