2024
MEETING
PROGRAM

SOCIETY FOR SOCIAL NEUROSCIENCE

S4SN

JAPAN

March 25–28, 2024

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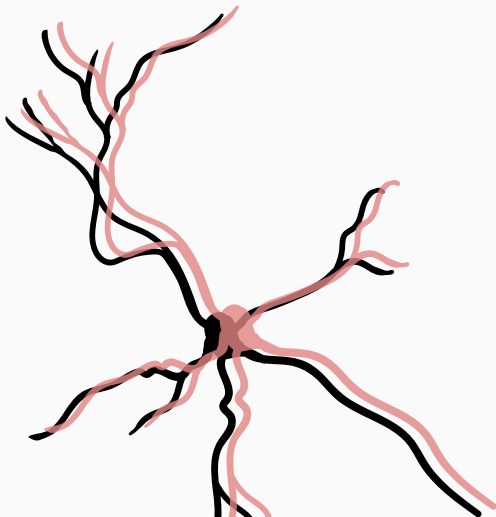

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INTRODUCTION

Welcome to S4SN 2024!
Our first ever multi-day international Meeting in Tsukuba, Japan!

I am extremely happy that so many skilled social neuroscientists from all over the world have made it to S4SN 2024. From the start, our organisation has promoted diversity both in terms of geographical locations and at the level of research approaches and model organisms.

At this year's meeting, we will hear about interbrain communication, dynamics of naturalistic social interactions, empathy, and many other exciting topics from speakers based in **13 different countries across 4 continents**. In addition, we have a record high number of poster presentations, with approximately even numbers presenting work from human and non-human animals.

Drawing parallels across species and exploiting the unique possibilities offered by different model systems is a great strength of the S4SN community. We encourage all scientists to bear in mind the diversity of our conferences attendees and their research approaches. Don't hesitate to ask questions, and remember that a simpler, less technical explanation will likely help your audience understand why *your* research question is *the coolest ever*.

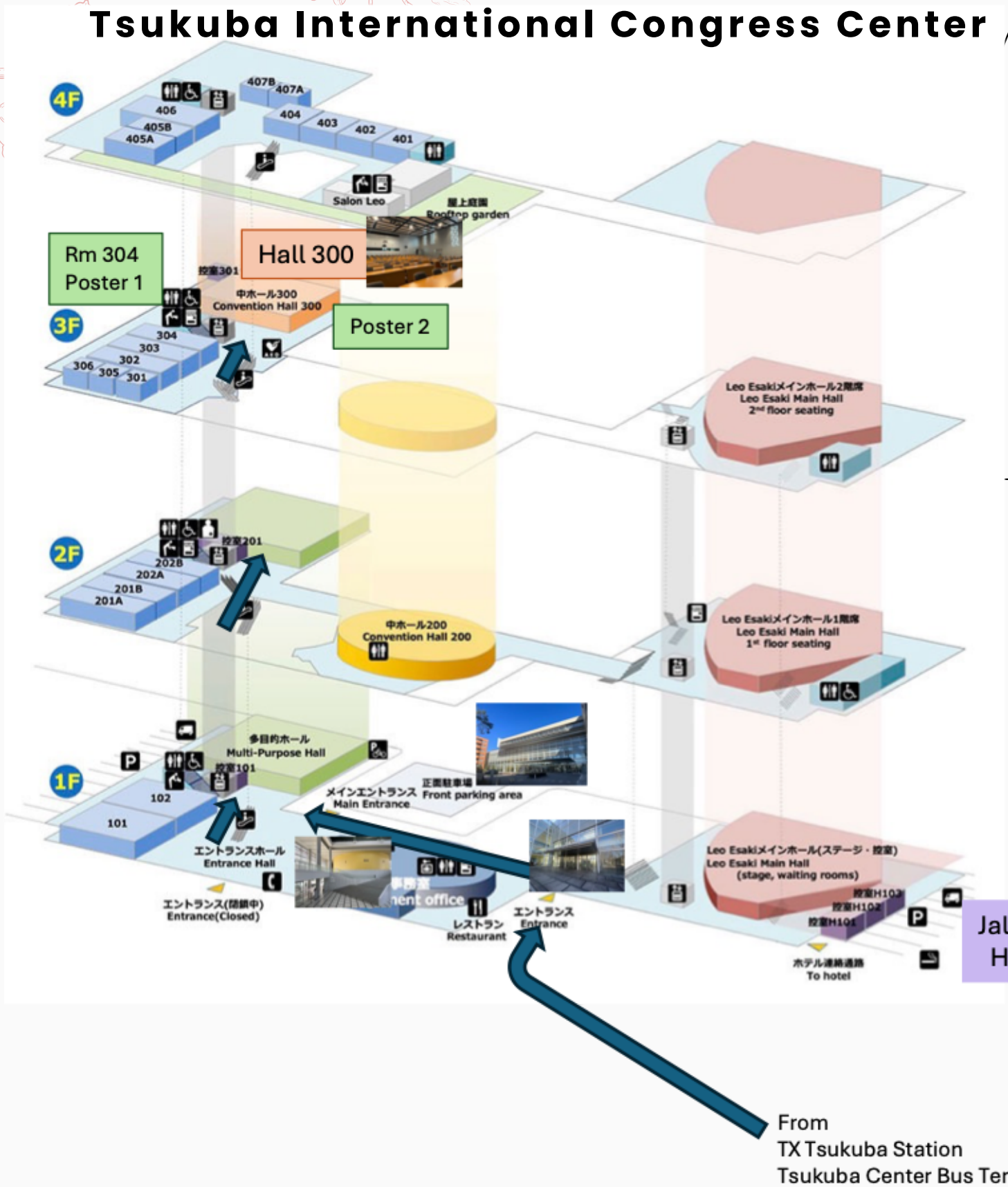
We are also so excited to launch our first-ever Mentoring program! We have 33 students, 13 postdocs, and 36 faculty signed up! We hope that this will allow our trainees to build community, seek support, and gain access to invaluable insight from their mentors!

I hope you will enjoy every moment of S4SN 2024: the talks, discussions, poster sessions, coffee breaks and excursions, and that you will come away energised and ready to push the social neuroscience field forward!

Sincerely,
Siri Leknes
S4SN President

VENUE MAP

Tsukuba International Congress Center



For more venue information and information about the area, please see the Travel and Information booklet!

SIMPLE SCHEDULE

Monday 3-25		Tuesday 3-26		Wednesday 3-27		Thursday 3-28	
		8:30 - 9:00	Coffee, snacks	8:30 - 9:00	Coffee, snacks	8:30 - 9:00	Coffee, snacks
9:00 - 10:00	Coffee, snacks & mingle Mentor-Mentee Meet Up	9:00 - 10:50	**Session 4** *Innate social behavior (aggression, sexual behavior, parental behavior)*	9:00-10:50	**Session 5** *A cross-species perspective on how the emotional state of others influences the state and decisions of observers*	9:00-10:50	**Session 8** *Outside of the ordinary Social Neuroscience - diverse species*
10:00 - 10:05	Introduction	10:50 - 11:10	Coffee/snacks	10:50 - 11:10	Coffee/snacks	10:50 - 11:10	Coffee/snacks
10:05-11:45	**Symposia 1** *Neural mechanisms underlying social behaviour across species and across the lifespan*	11:10 - 11:40	**Keynote** *Masaki Isoda*	11:10 - 11:40	**Keynote** *Shihui Han*	11:10-12:00	**Session 9** *(10 min short talks)*
		11:45 - 12:10	**Award Talk** *Nancy Padilla*	11:45 - 12:10	**Award Talk** *Emilie Caspar*		
11:45 - 12:00	GROUP PHOTO						
12:00 - 1:30	Lunch + Poster Session 1	12:10 - 12:20	Open Science Award Presentation	12:10 - 1:30	Lunch + Poster Session 2	12:00 - 1:30	Lunch
1:30 - 3:10	**Session 2** *Neural, psychological, and computational mechanisms of social motivation and reward*		Organized Excursions or Social gathering at the conference venue	1:30-3:10	**Session 6** *Social and physical pain and emotions*	1:30-3:10	**Session 10** *Understanding the Behavioral and Neural Dynamics of Naturalistic Social Interactions*
3:10 - 3:30	Coffee/snacks			3:10 - 3:30	Coffee/snacks	3:10 - 3:15	Closing remarks
3:30-5:10	**Session 3** *Interbrain communication in dyadic social interaction in health and disease.*			3:30-5:10	**Session 7** *Oxytocin and social cognition – relevance for mental health*		
5:10 - 5:30	Break, Happy Hour			5:10 - 5:30	Break, Happy Hour		
5:30 - 5:40	Data Blitz			5:30 - 5:40	Data Blitz		
5:40 - 7:30	Poster Session 1 Drinks, Happy Hour			5:40 - 7:30	Poster Session 2 Drinks, Happy Hour		

Note - meals are not included with the conference, only coffee and snacks. There will be organized "meet up" locations to connect with other conference attendees for meals.

Keynote

Tuesday, March 26, 11:10 am

MASAKI ISODA, PHD

Masaki Isoda is a professor at the National Institute for Physiological Sciences, Japan. He investigates the neural mechanisms underlying social cognition and behavior at the cellular and global network levels using macaque monkeys. He uses a variety of behavioral tasks designed for two monkeys facing each other, multisite and multielectrode neural recording methods, and dual viral vector techniques for pathway-selective blockade. He has identified cortico-cortical and cortico-subcortical pathways that are crucial for social action and reward monitoring. He was awarded the Tsukahara Nakaakira Memorial Award in 2017. For more information about Dr. Isoda, please visit: https://www.nips.ac.jp/eng/research/group/post-48/

PROBING THE SOCIAL MIND WITH ELECTRODES

Primates, including humans, are social by nature; their success as biological entities depends on how well they can deal with other individuals. The key to survival from a long-term perspective is to monitor the behavior of others, extract context-relevant information, and organize one's own behavior in socially appropriate manners. My laboratory has been investigating the neural mechanisms underlying behavioral monitoring, reward valuation, and their motivational impact in social contexts at the single neuron and global network levels. In this talk I show, using multi-site electrophysiological recording and circuit-selective intervention techniques in monkeys, that such social cognitive function is mediated by functionally interconnected cortical and subcortical structures.

Early Career Award Talk

Tuesday, March 26, 11:45 am

NANCY PADILLA-COREANO, PHD

Nancy Padilla-Coreano, Ph.D. is a Neuroscientist and Assistant Professor at the University of Florida in Gainesville. Her research explores how the brain enables humans and animals to navigate complex social dynamics and how this ability is disrupted in disease states. Dr. Padilla-Coreano uses behavioral assays, multi-site electrophysiology, and machine learning analyses to identify the neural circuit dynamics behind social competency in mouse models. She is a L'Oreal for Women in Science Fellow and was recently awarded the inaugural Henry Grass, M.D. Rising Stars in Neuroscience award. For information more about Dr. Padilla-Coreano, please visit: https://www.padillacoreanolab.com/

NEURAL CIRCUITS FOR SOCIAL COMPETENCE

Social interactions are essential for the survival of social animals. Across species the medial prefrontal cortex (mPFC) has been identified as a hub of social cognition. In mouse models we can dissect the neural circuits and dynamics underlying the role of mPFC in specific social behaviors. Combining novel behavioral assays, optogenetics, machine learning and wireless electrophysiology in mice, we demonstrate a role for the mPFC-hypothalamic pathway in driving social competition. We also discuss unpublished work regarding prefrontal and subcortical network interactions that change with competitive success. Finally, we explore the interrelations of social memory and social rank encoding in the mPFC.

Keynote

Wednesday, March 27, 11:10 am

SHIHUI HAN, PHD

Dr. Shihui Han is a professor at the School of Psychological and Cognitive Sciences and a principle investigator at PKU-IDG/McGovern Institute for Brain Research, Peking University, China. He investigates how sociocultural experiences shape neural mechanisms underlying social cognition and emotion and affect social decision-making and behavior. He proposes a Culture-Behavior-Brain loop model of human development to characterize cultural influences on brain and behavior and an asymmetric race processing model of racial ingroup favoritism in social emotion and behavior. He has published over 230 research articles and a book titled "The Sociocultural Brain". He is the founding chief editor of the journal "Culture and Brain" and an associate editor of "Social Cognitive and Affective Neuroscience" and “Neuroscience Bulletin”.

PSYCHOLOGICAL AND NEURAL NATURE OF RACE IN FACE PERCEPTION

People catch others’ racial identities by a glimpse of their faces. Perceived racial identities generate serious impacts on cognition, emotion, and behavior, resulting in substantial social consequences. Based on behavioral and brain imaging findings, I’ll discuss four principle cognitive components involved in race perception, including processes of perceived interracial difference, intraracial similarity, intraracial variation, and observers’ own racial identifications. These cognitive processes are associated with dynamic activities in distinct neural circuits covering the occipitotermporal cortices and anterior temporal/prefrontal cortices. These neurocognitive processes provide a basis of racial ingroup biases in social emotions and decision-making. Finally, I’ll discuss the implications of these social neuroscience findings for potential interventions of racial discrimination in social emotion and behaviors.

Early Career Award Talk

Wednesday, March 27, 11:45 am

EMILIE CASPAR, PHD

Emilie Caspar is a professor at Ghent University, Belgium, where she leads the Moral and Social Brain Lab. She specializes in social neuroscience, striving to uncover the neural mechanisms underlying moral and immoral decision-making. Her main research areas focus on obedience and how restricting one's autonomy and choice options impacts the brain. She works with various populations worldwide, including former genocide perpetrators in Rwanda and Cambodia, as well as inmates and military personnel. She has received numerous awards for her research, notably the prestigious ERC Starting Grant and she recently published a trade book that explores how obeying orders affects the brain, integrating her findings with testimonies from genocide perpetrators. She also collaborates with several NGOs worldwide to provide science-based tools that could assist citizens in resisting undue inducement.

THE NEUROSCIENCE OF (DIS)OBEDIENCE

It is no longer necessary to establish that human beings can follow orders, even in cold blood. As Howard Zinn pointed out, "historically, the most terrible things - war, genocide, and slavery - have resulted not from disobedience, but from obedience" (Zinn, 1997). Beyond historical events, experimental research has also highlighted the human tendency to obey orders that could cause serious harm to others (Milgram, 1963). Decades after Stanley Milgram's foundational studies, a neuroscientific perspective on obedience has emerged, aiming to understand how obeying orders can pave the way for moral transgressions and antisocial behavior towards others. Highlighting recent research using electrophysiological techniques and neuroimaging, paralleled with interviews conducted with former genocidaires in Rwanda and Cambodia, the main findings indicate that obedience to orders modifies cognitive and affective processes compared to freely decided actions. These studies aim to provide an understanding of the neural mechanisms associated with moral transgressions under the influence of authority, and how the brain makes the switch to resist immoral orders.

DAY 1 AT A GLANCE

Monday March 25, 2024	
9:00 - 10:00	**Coffee, snacks & mingle** **Mentor-Mentee Meet Up** (registration 9-12)
10:00 - 10:05	**Introduction**
10:05-11:45	**Symposia 1** *Neural mechanisms underlying social behaviour across species and across the lifespan*
10:05 - 10:30	Patricia Lockwood, University of Birmingham UK
10:30 - 10:55	Ziv Williams, Harvard Medical Centre, USA
10:55 - 11:20	Inbal ben Ami Bartal, Tel-Aviv University, Israel
11:20 - 11:45	Wouter van den Bos, University of Amsterdam, Netherlands
11:45 - 1:30	**Lunch + Poster Session 1**
1:30 - 3:10	**Symposia 2** *Neural, psychological, and computational mechanisms of social motivation and reward*
1:30 - 1:55	Matthew Apps, University of Birmingham, UK
1:55 - 2:20	Hikaru Sugimoto, RIKEN Center for Advanced Intelligence Project, Japan
2:20 - 2:45	Jo Cutler, University of Birmingham, UK
2:45 - 3:10	Steve Chang, Yale University, USA
3:10 - 3:30	**Coffee/snacks**
3:30-5:10	**Session 3** *Interbrain communication in dyadic social interaction in health and disease.*
3:30 - 3:55	Francesco Papaleo, Istituto Italiano di Tecnologia, Italy
3:55 - 4:20	Guillaume Dumas, Université de Montréal, Canada
4:20 - 4:45	Weizhe Hong, UCLA, USA
4:45 - 5:10	Eunee Lee, Yonsei University, Korea
5:10 - 5:30	**Break, Happy Hour**
5:30 - 5:40	**Data Blitz**
5:40 - 7:30	**Poster Session 1** **Drinks, Happy Hour**

DETAILED SCHEDULE: DAY 1

MONDAY, MARCH 25, 2024

9-12 **Registration**

9-10 **Coffee, Breakfast**
Come early and mingle in the main lobby

9-10 **Mentor-Mentee Meet-up**
Have a coffee and get to know your mentor/mentee. Meet by the registration desk in the main lobby

10-10:05 **Introduction**
Address from Siri Leknes, Society President

SYMPOSIA I

10:05-11:45 **NEURAL MECHANISMS UNDERLYING SOCIAL BEHAVIOUR ACROSS SPECIES AND ACROSS THE LIFESPAN**

10:05-10:30 *Neurocomputational basis of how and when to help others*
Patricia Lockwood, University of Birmingham UK

10:30-10:55 *Studying social cognition across animal species*
Ziv Williams, Harvard Medical School, USA

10:55-11:20 *To help or not to help? neurobiological mechanisms of prosocial decisions in rats*
Inbal ben Ami Bartal, Tel-Aviv University, Israel

11:20-11:45 *Uncertainty and Social Learning in Social Networks in Adolescence*
Wouter van den Bos, University of Amsterdam, Netherlands

11:45-1:30 **LUNCH BREAK**

DETAILED SCHEDULE

MONDAY MARCH 25, 2024

SYMPOSIA II

1:30-3:10 **NEURAL, PSYCHOLOGICAL, AND COMPUTATIONAL MECHANISMS OF SOCIAL MOTIVATION AND REWARD**

1:30-1:55 *Computational, anatomical, and neuromodulatory mechanisms of exerting effort to help others*
Matthew Apps, University of Birmingham, UK

1:55-2:10 *Neural mechanisms underlying the enhancement of memory and cognition by social reward and motivation*
Hikaru Sugimoto, RIKEN Center for Advanced Intelligence Project, Japan

2:10-2:35 *Human ventromedial prefrontal cortex is necessary for prosocial motivation*
Jo Cutler, University of Birmingham, UK

2:35-3:10 *Frequency Modules of Social Reward*
Steve Chang, Yale University, USA

3:10-3:30 COFFEE BREAK

SYMPOSIA III

3:30-5:10 **INTERBRAIN COMMUNICATION IN DYADIC SOCIAL INTERACTION IN HEALTH AND DISEASE**

3:30 - 3:55 *Inter-brain circuits of emotion recognition*
Francesco Papaleo, Istituto Italiano di Tecnologia, Italy

3:55 - 4:20 *From inter-brain connectivity to inter-personalized psychiatry*
Guillaume Dumas, Université de Montréal, Canada

4:20 - 4:45 *Neural basis of prosocial behavior*
Weizhe Hong, UCLA, USA

4:45 - 5:10 *Inter-brain connectivity between mPFCs in Shank2 mutant animal model of autism spectrum disorder*
Eunee Lee, Yonsei University, Korea

DETAILED SCHEDULE

MONDAY, MARCH 25, 2024

5:10–5:30 BREAK, HAPPY HOUR

5:30–5:40 DATA BLITZ TALKS

REM sleep-active hypothalamic neurons contribute to hippocampal social memory consolidation

Han Qin, Chongqing Institute for Brain and Intelligence

Sex differences in neural representations of social and nonsocial reward in the medial prefrontal cortex

Jennifer Isaac, Emory University

The role of prenatal exposure to climate-related disasters on auditory brainstem responses in newborns in high-risk neighborhoods.

Yoko Nomura, Queens College

Social attention in the wild - Interactive effects of oxytocin and naltrexone on social attention in ASD during a naturalistic interaction

Raimund Buehler, University of Vienna

5:40–7:30 POSTER SESSION I & HAPPY HOUR

POSTER #	TITLE, AUTHOR INFO

1 **Distinct subset of ventromedial hypothalamic neurons encode a conspecific-tuned, sex-specific behavioral state that modulates social investigation**
S.C. Lin, H.J. Lee, Y. Hsu, A. Su, S.B. Yang. National Taiwan University, Academia Sinica, National Ilan University

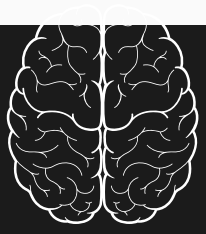
2 **When the brain says "No!": An MRI study on the neural correlates of resistance to immoral orders**
L. Tricoche, A. Rovai, S. Lo Bue, X. De Tiège, E. Caspar. Ghent University

3 **Neurocomputational components of trust**
X. Wu, N. Bürgi, G. Aydogan, C. C. Ruff. Beijing Normal University, University of Zurich

4 **Distinct neural encoding of culturally the own and alien stimuli**
Y. Pu, Q. Wang, S. Han. Peking University

5 **Differential inhibitory impact of the deep cerebellar nuclei on two distinct types of social interaction behaviors in male mice**
Y. T. Lin, W. S. Lai. National Taiwan University

DETAILED SCHEDULE



MONDAY, MARCH 25, 2024

5:40–7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

6 **Ego involvement and intrinsic motivation: Threats to perceived competence enhance neural reward processing during interpersonal competition, but thwart it when competition has ended.**
J. Barch, J. Carlson, E Nieman. Northern Michigan University

7 **Neurocomputational mechanisms of self-benefitting vs pro-environmental behavior**
B. Todorova, K. C. Doell, R. Sladky, C. Lamm. University of Vienna, Austria

8 **A Novel Electroencephalography-Based Paradigm to Measure Intergroup Prosociality**
G.P. Pech, E.A. Caspar. Université Libre de Bruxelles / Ghent University

9 **The impact of dark factor on cooperation in married and stranger dyads: a fNIRS-based hyperscanning study**
M. Makarova, N. Meloyan, I. Evdokimova, A. Upravitelev, A. Kurpatov, N. Volkova
HSE University, University of Trento, SBER

10 **An essential oxytocin circuit in the hypothalamus controls social avoidance in mice**
Y. Jiang, R. Yan, R. Tabuchi, L. Dayu. New York University

11 **Prefrontal modulation of collective response to environmental challeng**
T. Raam, Q. Li, L. Gu, K. Lim, G. Elagio, S. Correa, W. Hong. University of California, Los Angeles

12 **Initiation of male aggressive behaviors in mice: Pivotal role of adult hippocampal neurogenesis**
M. Tsuda, T. Akoh-Arrey, J. Mercurio, D. Lukasz, A. Rucker, M. Airey, H. Jacobs, H. Cameron. National Institute of Mental Health

13 **Optogenetic Activation of the Lateral Hypothalamus-Dorsal Raphe Nucleus Projection: Influences on Male Mice Aggression**
K. Mitsui, A Takahashi. University of Tsukuba

14 **Oxytocin receptor role for emotional contagion in Anterior cingulate or Amygdala**
Y.Saito, K.Mogi, T.Kikusui. Azabu University, School of Veterinary Medicine

DETAILED SCHEDULE

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5:40–7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

15 **Effect of prior recognition of social information on emotional attribution bias - Relationship with autism spectrum and social anxiety tendency-**
Y. Hirayama, H. Ishikane. Senshu University

16 **The pain facilitatory role of Oprm1-expressing brainstem to spinal cord-projecting neurons**
Q. Wang, G. Nachtrab, M. Mohr, J. Xiong, L. Yuan, X. Chou, J. V. L. King, M. A. Horowitz, X. Chen. Stanford University

17 **Reduce racial ingroup biases in empathy and altruistic decision-making by shifting racial identification**
S. Mei, S. Han. Peking University

18 **"The Farmer and the Snake": Neural Mechanisms of Social Feedback Modulation on Empathy**
X. Chen, S. Han. Peking University

19 **Distinct psychological and neural constructs of nationalism and patriotism**
G. Zheng, S. Han. Peking University

20 **Cognitive neural mechanism of the modulation of facial racial categorization by emotional expressions**
T. Huo, S. Han. Peking University

21 **Identifying tingle-eliciting properties of pleasant, calming and potentially socially relevant audiovisual stimuli: the Autonomous Sensory Meridian Response (ASMR)**
M. Jones, A. Daniels, K. Igelström, J. Suvilehto and I. Morrison

22 **Empathy-like behaviors in rats toward conspecifics with nausea**
M. Toyoshima, R. Tachihara, T. Xiong, K. Igarashi, M. Hori, K. Yamada. University of Tsukuba

23 **Factors that are involved in social instigation-heightened aggression in male mice**
T. Nagai, B. Hu, A. Takahashi. University of Tsukuba

24 **The neural mechanisms of consolation behavior in the anterior cingulate cortex**
R. Saito, D. Kumar, H. Funato, M. Yanagisawa, A. Aiba. The University of Tokyo, University of Tsukuba, Toho University

DETAILED SCHEDULE

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5:40-7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

25 **The role of dorsomedial striatal cholinergic interneurons in social hierarchy formation in male mice**
M.-T. Hsu, K. Tanaka, J. Wickens. Okinawa Institute of Science and Technology Graduate University

26 **A cingulate to septal circuit modulates peer group preference in a sex-specific manner in a communally breeding mammal**
A.M. Kelly, B.A. Fricker. Emory University

27 **REM sleep-active hypothalamic neurons contribute to hippocampal social memory consolidation**
H. Qin, L. Fu, X. Wang, X Chen. Chongqing Institute for Brain and Intelligence

28 **Hippocampal contributions to dynamic social memory in prairie voles**
W. Sheeran, K. Winther, J. Temple, Z. Donaldson. University of Colorado, Boulder

29 **Neural mechanisms underlying the effect of prediction errors in facial attractiveness between masked and unmasked faces on face memories in young and older adults**
M. Mihara, A. Kamo, T. Tsukiura. Kyoto University

30

31 **Roles of the social brain network and emotion network in memory for other persons with trustworthy impressions generated from social interaction**
A. Kamo, M. Mihara, T. Tsukiura. Kyoto University

32 **Social memory formation controlled by noradrenaline and microglia-mediated synaptic modulation in the medial prefrontal cortex**
H. Omi, M. Tajiri, T. Sawada, S. Yagishita. The University of Tokyo

33 **The social transmission of empathy relies on observational reinforcement learning**
Y. Zhou, S. Han, P. Kang, P. N. Tobler, G. Hein. Chinese Academy of Sciences, University of Würzburg

34 **Social neuroscience of the behavioral immune system: fMRI insights into collectivism and infection responses**
J. Choi, M. Sugiura. Tohoku University

DETAILED SCHEDULE

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5:40–7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

35 **Differential effects of intraperitoneal injections of oxytocin receptor antagonist, L-368,899, on social rank and other social behavior in mice**
S. Matsushima, D. Nasukawa, K. Yamada, Y. Ujihara, H. Hirakata, R. Tamura, S. Yatagai, K. Hayashi, K. Toda. Keio University, University of Tokyo, University of Tennessee Health Science Center

36 **Distal regulatory sequences contribute to diversity in brain oxytocin receptor expression patterns and social behavior**
Q. Zhang, L. Young. University of Tsukuba

37 **A cortical mechanism for integrating social information with estrous states to regulate sociosexual interest**
Y. Wang,* X. Song,* X. Chen,* Y. Zhou1,* J Ma,* F. Zhang,* L. Wei, G. Qi1, N. Yadav, Y. Yan, G. Yuan, D. Mi, P. Rajasethupathy, I. Ibañez-Tallon, X Jia, N. Heintz, K. Li. DG/McGovern Institute for Brain Research at Tsinghua, Tsinghua University. Tsinghua-Peking Joint Center for Life Sciences. Rockefeller University, Peking University

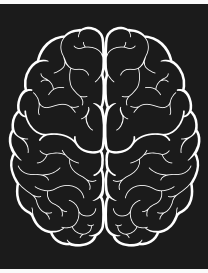
38 **Modulation of the behavioral and endocrine response to an aggression challenge by the neuropeptides isotocin and vasotocin in the Siamese fighting fish**
D. Goncalves, B. Fusani, A. Ramos, S. Cardoso. University of Saint Joseph, Instituto Gulbenkian de Ciencia, ISPA – Instituto Universitario

39 **Novel aromatase-flox mice show the behavioural relevance of locally produced estrogens in the hypothalamus**
N. Vasudevan, D. Davis, J. Dovey, K. Thaweepanyaporn, S. Sagoshi, H. Takahashi, M. Nakata, S. Ogawa. University of Reading, University of Tsukuba

40 **The neural mechanism regulating psychological stress-induced sweet taste modification**
M. Tanaka, R. Nawarat, S. Okamoto, Y. Minokoshi, T. Misaka, K. Nakajima. University of Tokyo, National Institute for Physiological Sciences, Nagoya University, Ryukyu University

41 **Understanding the neural nechanisms for repetitive behaviors: A role for hypothalamic endocannabinoids**
G. Petriel, G. Balsevich, H. Yau, R. Aukema, M. Van Der Stelt, J. Bains, L. Mayo, M. Hill, Hotchkiss Brain Institute, University of Calgary, Leiden University

DETAILED SCHEDULE



MONDAY, MARCH 25, 2024

5:40-7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

42 **Intergenerational transmission of maternal behavioral traits in mice and the involvement of microbiota in this transmission**
K. Mogi, U. Akiyama, N. Futagawa, K. Tamura, M. Kamiya, M. Mizuta, M. Yamaoka, I. Kamimura, S. Kuze-Arata, T. Kikusui. Azabu University

43 **Investigating neurotransmitter systems, neural networks, and social behavior using non-traditional animal models**
A. Hinojosa, E. Alaniz, F. Dominguez, G. Padilla, I. Perez, B. Barnes, A. Mar, J. L. VandeBerg, M. Gil. University of Texas Rio Grande Valley

44 **An application of Parametric Empirical Bayes (PEB) on social neuroscience**
T. Asamizuya, H. Saito, R. Higuchi, g. Naruse, S. Ota, J. Kato. Hitotsubashi University, The University of Tokyo, Meiji University

45 **The physical and mental health benefits of touch interventions: A comparative systematic review and multivariate meta-analysis**
J. Packheiser, H. Hartmann, K. Fredriksen, V. Gazzola, C. Keysers, F. Michon Netherlands Institute for Neuroscience, University Hospital Essen

46 **The neural bases of how dogs and humans navigate their social environment**
M. Boch, C. Völter, R. B. Mars, L. Huber, C. Lamm. University of Vienna, University of Oxford, University of Veterinary Medicine Vienna, Max Planck Institute for Evolutionary Anthropology

47 **Repetition suppression effects reveal distinct time courses of spontaneous categorization of elderly and young faces**
N. Zhou, S. Han. PKU-IDG/McGovern Institute for Brain Research, Peking University

48 **Neural representation of natural human conversation**
J. Cai, A. Hadjinicolaou, A. Paulk, D. Soper, T. Xia, Z. Williams, S. Cash Massachusetts General Hospital, Harvard Medical School

49 **MDMA modulates sensorimotor and affective pathways in the human cortex during affective touch**
G. Novembre, H. Molla, L. Handlin, I. Perini, I. Morrison, H. de Wit. Linköping University, University of Chicago, University of Skövde

DETAILED SCHEDULE

MONDAY, MARCH 25, 2024

5:40-7:30 POSTER SESSION I

POSTER #	TITLE, AUTHOR INFO

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51 **Impact of oxytocin receptor mutation on social distancing in male medaka fish mediated by visual familiarity recognition**
A. Yamaguchi*, J. Zou*, R*. Umeda, T*. Seki, K. Mizukuchi, S. Ansai, H. Takeuchi. Tohoku University, Kyoto University

52 **The role of prenatal exposure to climate-related disasters on auditory brainstem responses in newborns in high-risk neighborhoods**
Y. Nomura, D. Deingeniss, S.Y. Siel, A. Gordon, P. Kittler, H. Phan. Queens College, City University of New York, New York State Institute for Basic Research in Developmental Disabilities

53 **Effects of intraperitoneal injection of a non-competitive NMDA receptor antagonist, MK-801, on social and non-social behavior in male mice.**
H. Kasahara, R. Tamura, Y. Ujihara, M. Yamamoto, S. Matsushima, Y. Tamai, D. Nasukawa, K. Hayashi, K. Yamada, M. Tanaka, K. Toda. Keio University, University of Tennessee Health Science Center, University of Tübingen Medical Center, Japan Society for Promotion of Science, University of Tokyo, Waseda University

54 **Disentangling the impact of substance use in offenders with antisocial personality disorder - a resting state fMRI study**
C. C. Stein, C. Kärgel and B. Schiffer. Ruhr-University Bochum

55 **Nucleus accumbers oxytocin mediates social isolation-induced anxiety-like behaviors in female prairie voles**
Y. Liu, F. Duclot, M. Kabbaj, Z. Wang. Florida State University

56 **Social attention in the wild - Interactive effects of oxytocin and naltrexone on social attention in ASD during a naturalistic interaction**
R. Buehler, G. Silani, U. Ansorge, M. Willeit. University of Vienna, Medical University Vienna

57 **Neuroticism associated with the activities in left ventrolateral prefrontal cortex and motor cortical area during emotional imagery task**
S. Irie, M. Watanabe, A. Tachibana, N. Tokuda, A. Matsuo. Dokkyo Medical University, The University of Tokyo

DETAILED SCHEDULE

MONDAY, MARCH 25, 2024

5:40-7:30 POSTER SESSION I

POSTER # TITLE, AUTHOR INFO

58 **The regulation of social facilitation by monoaminergic system**
T. Furukawa, T. Fujiwara. Saitama Medical University

59 **Neural signature of disrupted sociality: Understanding the inter-brain neural relationship across the brains of socially interacting Shank2 mutant mice**
E.Hwang, W.Kim, H-G. Yoon, S.Shin, S.Lee, E.Kim, E.Lee. Yonsei University, Korea Advanced Institute of Science & Technology

60 **The power of music: Enhancing predictive ability in children with autism through music therapy**
A. U. Kocan, A. Groessing, A. Guran, N. Mikus, C. Gold, G. Silani. University of Vienna, Norwegian Research Centre (NORCE)

61 **Link between broad and detailed aspects of social perception in children, adolescents and adults with typical development and with autism spectrum disorders: an eye-tracking study**
A. A. Saitovitch, E. Rechtman, A. Vinçon-Leite, H. Lemaître, K. Aljabali, A. Fabre, J. Boisgontier, L. Fillon, N. Boddaert, M. Zilbovicius. Imagine Institute, INSERM U1163/U1299, Necker-Enfants Malades Hospital, AP-HP, Université Paris Cité,

62 **Embodiment in Virtual Reality (VR) influences the neural processes of face gender categorization and improves empathy**
H. Zheng, S. Han. Peking University

63 **Increased dyadic social interaction by lipopolysaccharide-induced inflammatory reactions in male but not female mice**
M. Yamamoto, K. Hayashi, M. Kanayama, S. Matsushima, H. Inoue, H. Kasahara, K. Toda. Keio University, Tokyo Medical and Dental University

64 **Sex-dependent modulation of neuronal circuits in object recognition through pair bonding**
H. Iwai, C. Ohtsuki, R. Noguchi, A.Totsuka, E. Kamura, S. Mitsui. Gunma University Graduate School of Health Sciences

65 **Pair bonding has sex-dependently an impact on neuronal circuits that respond to fear conditioning in monogamous prairie voles**
R. Noguchi, H. Iwai, A. Totsuka, S. Mitsui. Gunma University Graduate School of Health Sciences

DETAILED SCHEDULE

MONDAY, MARCH 25, 2024

5:40-7:30 POSTER SESSION I

POSTER # TITLE, AUTHOR INFO

66 **Sex differences in neural representations of social and nonsocial reward in the medial prefrontal cortex**
J. Isaac, S. Karkare, H. Balasubramanian, N. Schappaugh, J. Javier, M. Rashid, M. Murugan
Emory University

67 **Simultaneous tracking of autonomic nervous activity and home cage behavior in mouse mothers during pregnancy to lactation**
K. Shimizu, S. Kuze-Arata, Takefumi Kikusui, Kazutaka Mogi. Azabu University

68 **On the relationship between self-regulation problems in parents and their children: An ERP study**
K. Wiecheć, J. Bączek, M. Krystkowiak-Kowalska, P. Stodolna, J.M. Michałowski
University SWPS, Poznań Laboratory of Affective Neuroscience

69 **Investigating the role of oligodendrocytes in regulating pair bonding and the responses to loss in prairie voles**
J. Sadino, Z. Donaldson. University of Colorado Boulder

70 **Developmental onset of pair bonding behavior in prairie voles**
L. C. Hiura, C. A. Schaepe, J. A. Noe. University of Colorado Boulder

71 **Social connectedness in the context of stress: role of endogenous opioids**
G. Løseth, S. Leknes. University of Oslo, Oslo University Hospital

72 **Secondary teachers' neural and heart-rate dynamics while evaluating their own students' versus other students' academic work**
X.-F. Yang, C. Kundrak, C. Moliterni, M. H. Immordino-Yang. University of Southern California

73 **Neurocomputational mechanisms of affected beliefs**
S. Krach, N. Czekalla, A.V. Mayer, A. Schröder, D.S. Stolz, F.M. Paulus, L. Müller-Pinzler.
Lübeck University

74 **Transcendent thinking counteracts longitudinal effects of mid-adolescent exposure to community violence in the anterior cingulate cortex**
X.-F. Yang, K. Hilliard, R. Gotlieb, M. H. Immordino-Yang. University of Southern California, University of California Los Angeles

75 **Effects of a mixed mind-body and psychosocial intervention model on mental health indicators, prosociality and hearth rate variability. A study with a Venezuelan migrant population in Colombia.**
J.C. Caicedo, M. Serna, J. Kolacz, L. Otálora, N. Quiñonez, M.A. López, J. Martínez, D.M. Aponte. Universidad Externado de Colombia, Ohio State University and Dunna Corporation

76 **Interpersonal Neural Synchronization during Mutual Prediction in Ball Catching Task**
Y. Kurihara, R. Ohkuma, A. Tsuchiya, S. Franklin, D. Franklin, and R. Osu. Waseda University, Technical University of Munich

NEURAL MECHANISMS UNDERLYING SOCIAL BEHAVIOUR ACROSS SPECIES AND ACROSS THE LIFESPAN

NEUROCOMPUTATIONAL BASIS OF HOW AND WHEN TO HELP OTHERS

Patricia Lockwood, University of Birmingham UK

Many of our decisions affect other people. Our choices can decelerate climate change, stop the spread of infectious diseases, and directly help or harm others. Prosocial behaviours ,Äì decisions that help others , could contribute to reducing the impact of these challenges, yet their computational and neural mechanisms remain poorly understood.

I will present recent work that examines the neurocomputational basis of prosocial learning, how we learn to benefit other people and when we decide to act. I will show that prosocial learning depends on medial prefrontal regions using computational modelling, functional neuroimaging and voxel-based lesion-symptom mapping. However, when we decide to act to help is also substantially affected by the environment we find ourselves in. When we believe the reward rate of the environment is poor, we are more willing to act to help than when we are in a rich environment, and this ecological influence is stronger than when we make similar decisions that only benefit ourselves. These findings have potential implications for understanding learning and decision-making to help others as environments change.

STUDYING SOCIAL COGNITION ACROSS ANIMAL SPECIES

Ziv Williams, Harvard Medical School, USA

Social behavior pervades many aspects of our lives, and deficit in social behavior is a prominent feature of many neurocognitive conditions such as major depression and autism spectrum disorder. Yet, despite its importance, the single-neuronal basis and causal underpinnings of interactive social behavior remain not well understood. The talk will briefly discuss use of genetic, neurophysiologic and neuromodulatory techniques for studying social cognitive processes across species. Using rodent, non-human primate and human experiments, the talk will cover some of the neuronal processes involved in social interaction, group behavior, theory of mind and communication. It will also cover emerging new methods for treating social behavioral disorders and suggest a comprehensive approach for studying social cognition across animal species.

NEURAL MECHANISMS UNDERLYING SOCIAL BEHAVIOUR ACROSS SPECIES AND ACROSS THE LIFESPAN

TO HELP OR NOT TO HELP? NEUROBIOLOGICAL MECHANISMS OF PROSOCIAL DECISIONS IN RATS

Inbal ben Ami Bartal, Tel-Aviv University, Israel

What are the neural processes that lead to a decision to approach a distressed conspecific and act for their benefit? Multiple factors weigh in on this decision, in particular the social identity of the individual in need. To determine this, and explore how empathy, the capacity to recognize and share others,Äô affective states, promote prosocial behavior, we use a rat helping behavior test. During the test a rat may help a distressed conspecific by releasing it from a trap. Rats typically learn to help after a few sessions, without any previous training or reward. Once they learn how to open the restrainer, they repeat the behavior on subsequent sessions quickly and reliably. This goal-directed behavior is motivated by the trapped rats,Äô distress, and help is only offered to in-group members. Neural activity involved in this process can be examined and manipulated. The brain-wide neural circuitry involved in this behavior is outlined using Brainways, our automated software for registration and quantification of fluorescence. We found the helping test is associated with a dispersed network which includes regions involved in empathy in humans, and reward-related regions. The role of the nucleus accubmens is investigated, both for social and prosocial reward. Neural activity in the empathy network reveals that activity in empathy related regions does not predict helping, and that while the accumbens does predict helping, it isn,Äôt necessary for helping to occur. We suggest instead that the decision to help may depend on coding of the value of helping in the OFC.

UNCERTAINTY AND SOCIAL LEARNING IN SOCIAL NETWORKS IN ADOLESCENCE

Wouter van den Bos, University of Amsterdam, Netherlands

Adolescence is a period of social re-orientation in which we are generally more prone to peer influence and the updating of our beliefs based on social information, than in any other stage of our life. One of the reasons that adolescents are more sensitive to social information is because of their uncertainty associated with their new environment of development. Here I will present a Bayesian reinforcement learning framework that incorporates uncertainty and social learning. With agent based models I will demonstrate that uncertainty of adolescence by itself can incerase both exploratory behavior and social learning, with a natural deciline towards adulhood. I will show how uncertainty will drive both information search and information use. Finally, I will then substantiate this framework alongside recent results from a neuroimaging (fMRI) study in which we investigated individual differences in the assessment of uncertainty and how this leads to differences in social information use.

NEURAL, PSYCHOLOGICAL, AND COMPUTATIONAL MECHANISMS OF SOCIAL MOTIVATION AND REWARD

COMPUTATIONAL, ANATOMICAL, AND NEUROMODULATORY MECHANISMS OF EXERTING EFFORT TO HELP OTHERS

Matthew Apps, University of Birmingham, UK

Prosocial behaviours, actions that benefit others, are central to individual and societal well-being. Although the mechanisms underlying the financial and moral costs of prosocial behaviours are increasingly understood, this work has often ignored a key influence on behaviour: effort. Many prosocial acts are effortful, and people are averse to the costs of exerting them. But are they more averse to effort when it is self-benefitting, or when it helps others? and what neural mechanisms that underlie prosocial effort? I present a series of studies where people made decisions about whether to exert different amounts of effort to obtain financial rewards. On half of the trials they earn the rewards through effort (self), on other half they must exert the effort but the money is delivered to another person (prosocial). We demonstrate that people are more willing to exert effort for their own benefit than for others. Using fMRI and computational modelling we identified a unique neural signature of effort in the anterior cingulate gyrus (ACCg) for prosocial act. This signal of effort was absent for self- benefiting behaviours. Moreover, the more strongly a representation of effort was specific to prosocial acts in the ACCg, the higher a person, as level of empathy. In addition, we show that dopamine withdrawal in Parkinson, as Disease impacts only prosocial motivation and not on the willingness to exert effort for self-benefit. These results highlight the importance of effort in prosocial behaviour, and the key frontal cortex and dopaminergic mechanisms driving it.

NEURAL MECHANISMS UNDERLYING THE ENHANCEMENT OF MEMORY AND COGNITION BY SOCIAL REWARD AND MOTIVATION

Hikaru Sugimoto, RIKEN Center for Advanced Intelligence Project, Japan

People can be motivated by interactions with others. Motivation and affect can influence cognitive performance, but little is known about the neural mechanisms underlying how memory and cognition are enhanced or suppressed during social interaction. Social comparison refers to the process of making comparisons between oneself and others. This fundamental psychological process is thought to play a pivotal role in the evaluation of the self in terms of abilities and opinions. The neurocognitive literature on social comparison has focused on ability-based social comparison and has shown that brain regions involved in the process of primary and secondary reward are also recruited when people outperform others in a task, whereas those involved in the process of physical and monetary punishment respond to feedback informing them that they have performed worse than others. These findings suggest that victory and defeat may have a rewarding or punishing value in a social context. Based on this idea, my colleagues and I have conducted several fMRI studies to investigate the neural mechanisms of how victory in competition, i.e. social reward, enhances episodic memory and how memory performance is improved by social motivation in the context of competition. We have also used a multimodal MRI approach to investigate the neural substrate that can be altered by an orientation towards opinion-based social comparison. In this symposium, I will present our recent publications on neuroimaging studies that have investigated these issues.

NEURAL, PSYCHOLOGICAL, AND COMPUTATIONAL MECHANISMS OF SOCIAL MOTIVATION AND REWARD

HUMAN VENTROMEDIAL PREFRONTAL CORTEX IS NECESSARY FOR PROSOCIAL MOTIVATION

Jo Cutler, University of Birmingham, UK

The ventromedial prefrontal cortex (vmPFC) has long been considered vital for decision-making. Functional neuroimaging suggests important contributions of the vmPFC to processing rewards and effort costs, while a parallel stream of work suggests vmPFC is involved in prosocial behaviour. However, the necessity of the vmPFC for these functions is unknown. Here we dissociated the causal contribution of vmPFC to prosocial behaviour (decisions causing real beneficial outcomes for another person), effort, and reward with a decision-making task that manipulates these factors independently. A large group of patients with rare focal vmPFC lesions (n=25) was compared to patients with lesions elsewhere (n=15), and healthy age and gender-matched controls (n=40). Participants chose either to rest, or to exert effort, to gain rewards, for themselves or another person. Computational modelling quantified how prosocial and self-benefitting rewards were devalued by effort. vmPFC damage decreased prosociality across several measures. Patients with lesions here earned less, were more reluctant to exert effort, and physically exerted less force when another person would benefit, compared to both control groups. Voxel-based lesion mapping revealed a striking dissociation between medial and lateral subregions of vmPFC. Whilst medial damage led to antisocial behaviour, more lateral damage was associated with increased prosocial motivation, relative to patients with damage elsewhere. Patients with vmPFC lesions also showed reduced sensitivity to effort but not reward overall, although lesion mapping identified vmPFC subregions that reduced reward sensitivity as well. These findings reveal multiple, specific, causal contributions of vmPFC sub-regions to prosocial behaviours, effort processing, and reward sensitivity.

FREQUENCY MODULES OF SOCIAL REWARD

Steve W. C. Chang, Yale University, USA

The “social brain” refers to a collection of cortical and subcortical brain areas that are often recruited by a wide array of social behaviors. However, it remains unclear how different areas in the social brain are coordinated to transmit and process social variables to guide learning and decision-making. This talk will describe our recent findings from studying the primate medial prefrontal-amygdala circuits during social decision-making involving pairs of rhesus macaques. As monkeys expressed context-dependent prosocial and antisocial preferences concerning the reward received by a conspecific monkey, we investigated neuronal interactions between the basolateral amygdala and the rostral anterior cingulate gyrus. First, we found that the coordination between the two neural populations was enhanced for expressing a prosocial preference but suppressed for expressing an antisocial preference. This coordination occurred in selective frequency channels depending on the area contributing the spikes and showed a specific directionality of information flow for expressing the prosocial preference. Moreover, at the time of reward delivery, we noticed unique coherence patterns for vicarious reward in comparison to experienced reward. These patterns also differed from those observed when expressing social preferences. The reward-related coordination again occurred in specific frequency channels with selective directionality. Based on these findings, we suggest that there are directionally selective ,Äòfrequency modules,Äô that convey socially relevant decision variables. More broadly, these findings support the importance of network-level controls in the social brain.

INTERBRAIN COMMUNICATION IN DYADIC SOCIAL INTERACTION IN HEALTH AND DISEASE

INTER-BRAIN CIRCUITS OF EMOTION DISCRIMINATION

Francesco Papaleo, Istituto Italiano di Tecnologia, Italy

Social interactions imply dynamic and synergic feedback loops in which actions, reactions, and internal cognitive processes of each partner are modulated by the others. Pioneering discoveries show that brains working together, couple together, through interbrain synchrony. However, it is unclear whether interbrain dynamics change in the context of altered emotions, and if they might be causative for driving social interactions. Combining microendoscopic Ca2+ imaging in the anterior cingulate cortex, area 24, with a behavioral task for emotion recognition in mice, we are finding that somatostatin-expressing (SOM+) neurons synchronize when a mouse interact with a stressed mouse, but not with mice in a neutral state. Conversely, data suggests that pyramidal neuron activity is correlated only among mice in a neutral state. This provides a first indication of cortical inhibitory neurons involvement in social interbrain neural dynamics in the context of altered emotions.

FROM INTER-BRAIN CONNECTIVITY TO INTER-PERSONALIZED PSYCHIATRY

Guillaume Dumas, Université de Montréal, Canada

This presentation integrates multi-brain neuroscience and precision psychiatry to better understand social cognition in interactive contexts, in both health and disease. Utilizing hyperscanning technologies, we explore inter-brain connectivity (IBC) and its implications in neural synchronization during social interactions. We will discuss the uncovered neural mechanisms underlying social interaction and their disruptions in psychiatric conditions. By merging these findings with computational models, we introduce: inter-personalized psychiatry. This approach, rooted in precision medicine, leverages the dynamic neural interplay among individuals to develop personalized psychiatric treatments taking the interpersonal dimension seriously. Our work exemplifies how integrating multi-brain neuroscience with computational methodologies can lead to innovative diagnostics and therapeutic strategies in mental health, emphasizing the importance of considering social and neural interactions in psychiatric care.

INTERBRAIN COMMUNICATION IN DYADIC SOCIAL INTERACTION IN HEALTH AND DISEASE

NEURAL BASIS OF PROSOCIAL BEHAVIOR

Weizhe Hong, UCLA, USA

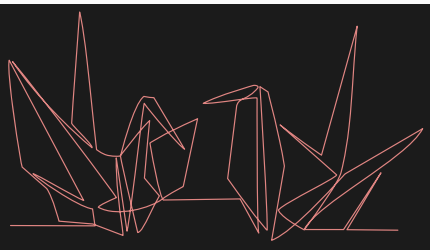
While it is evolutionarily logical for individuals to behave in ways that benefit themselves and maximize an individual,Äôs own survival and reproduction, humans and other animals also engage in empathy and compassion-related behaviors that benefit others. In humans, the ability to understand and support the emotions or needs of others is crucial to creating a more cohesive, compassionate, and successful society. Spanning the evolutionary spectrum, animals exhibit diverse prosocial behaviors, including comforting, helping, and resource sharing, to support others,Äô emotions, goals, and/or material needs. Our research aims to understand various forms of empathic and prosocial behaviors and the underlying neural mechanisms. We establish behavioral paradigms in mice to study prosocial comforting and helping behaviors. Using these paradigms, combined with molecular genetics and computational approaches, we identify the molecularly and anatomically defined neural pathways in the amygdala and the prefrontal cortex that specifically encode and control these behaviors. Beyond studying how neural circuits and the underlying computation regulate social behavioral decisions within a single brain, we are also interested in investigating how emergent inter-brain neural properties arise from social interactions between individuals.

INTER-BRAIN CONNECTIVITY BETWEEN MPFCS IN SHANK2 MUTANT ANIMAL MODEL OF AUTISM SPECTRUM DISORDER

Eunee Lee, Yonsei University, Korea

What happens in the brains of socially interacting individuals? This key question in social neuroscience has generated decades of research, especially from neuroscientists studying autism spectrum disorder(ASD). Patients diagnosed with ASD are often incapable of engaging in a typical social interaction and show a lack of social interest or motivation. Yet, the unique characteristics of the neural activities in ASD patients that may lead to this pronounced social deficit remain elusive. Recent literature highlights the existence of a synchronized brain activity between socially interacting individuals. This inter brain synchrony has been studied in not only humans but also in animals such as mice and bats. While the presence of the phenomenon itself has been investigated in multiple studies using fMRI, EEG, and Ca2+ imaging, a comprehensive study on the specific intrinsic features of this phenomenon has yet to be conducted. Moreover, the direct relationship between social interaction and interbrain synchrony remains unknown. In this study, we explore the inter brain relationship between the brains of socially interacting mice, with a particular focus on inter brain synchrony or inter brain similarity. We conducted simultaneous in vivo electrophysiology recordings in the medial prefrontal cortex (mPFC) of freely socially interacting mice, a brain region that has been found to play an essential role in social behaviors. We employ two types of mice, Shank2 gene knockout mice (Shank2 KO), a well-established animal model of ASD and Shank2 wild type mice (Shank2 WT). We present behavioral findings, and results from single neuron neuronal correlates analysis, and local field potential analysis. Preliminary results suggest genotype-specific neural activities in the mPFC of socially interacting mice and decreased inter brain synchrony between two interacting ASD model mice.

DAY 2 AT A GLANCE



Tuesday March 26, 2024	
8:30 - 9:10	**Coffee, snacks** (registration 8:30-12)
9:10 - 10:50	**Session 4** *Innate social behavior (aggression, sexual behavior, parental behavior)*
9:10 - 9:35	Lisa Stowers, The Scripps Research Institute, USA
9:35 - 10:00	Kumi Kuroda, RIKEN Center for Brain Science, Japan
10:00 - 10:25	Julia Sliwa, CNRS, France
10:25 - 10:50	Sonoko Ogawa, University of Tsukuba, Japan
10:50 - 11:10	**Coffee/snacks**
11:10 - 11:40	**Keynote** **MASAKI ISODA** *Probing the social mind with electrodes*
11:45 - 12:10	**Award Talk** **NANCY PADILLA CORENO** *Neural circuits for social competence*
12:10 - 12:20	**Open Science Award Presentation**
	Organized Excursions **or** **Social gathering at the conference venue**

DETAILED SCHEDULE: DAY 2

TUESDAY, MARCH 26, 2024

8:30-12 **Registration**

8:30-9:10 **Coffee, Breakfast**
Come early and mingle in the main lobby

SYMPOSIA IV

9:10-10:50 **INNATE SOCIAL BEHAVIOR: AGGRESSION, SEXUAL BEHAVIOR, PARENTAL BEHAVIOR**

9:10 -9:35 *Leveraging olfaction to study social behavior in the mouse*
Lisa Stowers, The Scripps Research Institute, USA

9:35 - 10:00 *Filial attachment in common marmosets: Its ontogeny and the relevant brain regions*
Kumi Kuroda, Tokyo Institute of Technology, RIKEN

10:00 - 10:25 *Comparing human and monkey neural circuits for processing visual social scenes*
Julia Sliwa, CNRS, France

10:25 - 10:50 *Estrogen receptor beta neuronal network in the regulation of social behaviors in mice*
Sonoko Ogawa, University of Tsukuba, Japan

10:50-11:10 Coffee

DETAILED SCHEDULE: DAY 2

TUESDAY MARCH 26, 2024

KEYNOTE: MASAKI ISODA

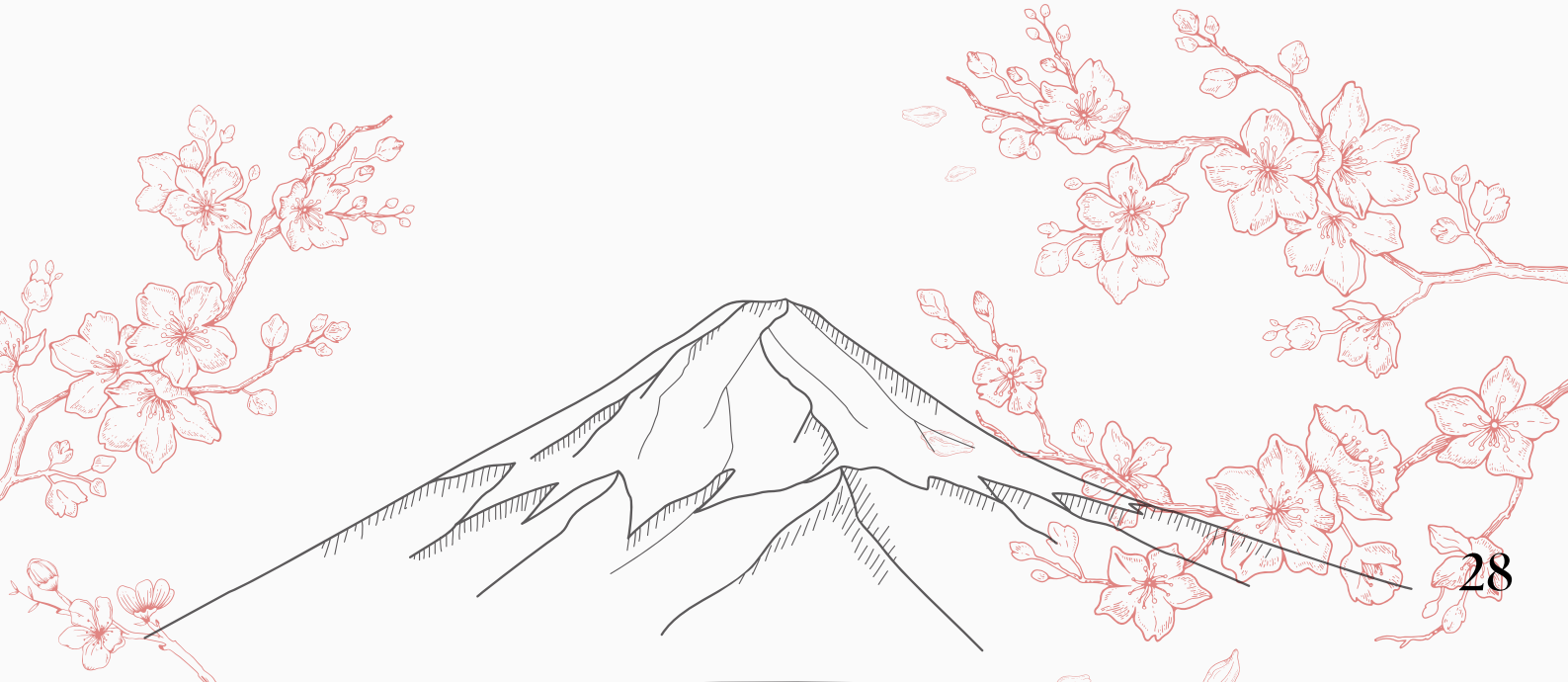
11:10-11:45 **PROBING THE SOCIAL MIND WITH ELECTRODES**

EARLY CAREER AWARD: NANCY PADILLA COREANO

11:45-12:10 **NEURAL CIRCUITS FOR SOCIAL COMPETENCE**

12:10-12:20 **OPEN SCIENCE AWARD ANNOUNCEMENT**

12:20- ON **FREE AFTERNOON |** CHECK OUT THE RECOMMENDED EXCURSIONS IN THE TRAVEL INFO BOOKLET



INNATE SOCIAL BEHAVIOR: AGGRESSION, SEXUAL BEHAVIOR, PARENTAL BEHAVIOR

LEVERAGING OLFACTION TO STUDY SOCIAL BEHAVIOR IN THE MOUSE

Lisa Stowers, The Scripps Research Institute, USA

The Stowers Lab is studying the logic of the olfactory system to perform sensation while leveraging the stereotypy, simplicity, and robustness of olfactory-promoted courtship behavior to identify corresponding neural circuits and mechanisms. Though the behavior is relatively simple, these circuits display characteristics of more complex behaviors including state-dependency, decision-making, emotion, and learning. How does olfaction guide behavior? Much of our understanding of how olfaction works in mice is based on highly controlled artificial stimulus and response parameters. This has allowed us to make great progress to understand concentration thresholds, mixture perception, and sensation dynamics to create a solid foundation of what the system is capable of sensing. Other research is identifying the ,Äòmeaning, of sensation by focusing on behavioral responses to odor cues and studying the coding logic of downstream circuits. These studies are largely blind to sensation dynamics. Currently, we are missing a complete picture of how odor cues are being sensed to guide behavior during free investigation of natural scenes. We are applying mini-endoscopes that do not interfere with natural movement, so that vomeronasal sensation can be measured and studied as the individual navigates towards, interacts with, and responds to a wide variety of simple, complex, and social stimuli. This enables us to identify when, what, and how chemosensation is being used during natural behavior. The dynamics are quite different from inspiration-driven sense of smell and are likely to inform behavior on unknown timescales. We expect that combining the study of real-time sensation with the activity observed during social behavior of downstream circuits will reveal unexpected features of social dynamics.

FILIAL ATTACHMENT IN COMMON MARMOSETS: ITS ONTOGENY AND THE RELEVANT BRAIN REGIONS

Kumi Kuroda, Tokyo Institute of Technology, RIKEN, Japan

The parent (primary caregiver) is the lifeline of mammalian infants. Thus, infants memorize and selectively follow their primary caregiver and signal their distress (crying). These behaviors are collectively called attachment behaviors. We previously found that in mice and humans, when caregivers carry the infants, infants reduce their crying, voluntary movement, and heart rate immediately. This phenomenon, , the Transport Response,Äù facilitates the parental transport of the offspring and thus is a primitive component of the infant attachment system.

New World Monkeys common marmosets live in family and share carrying care of their infants among both parents and older siblings. We found that infants cry vigorously when being rejected by the current carrier or being isolated, and halt crying as soon as the next family member starts carrying them. Infants also tune their attachment behaviors according to the parenting style of each caregiver: infants are anxious during carry by intolerant caregivers, and physically avoid intolerant or insensitive caregivers. Such an efficient attachment system develops in the average-expectable rearing environment of this species; if the infants are separated from their family in infancy, they avoid any caregivers while showing age-disproportionate separation distress. Paradoxically negative reactions toward inherently rewarding stimuli are extended to adulthood and exhibited even toward non-social rewards.

To identify the brain regions relevant to infant attachment behaviors, we are performing the ,brief isolation and reunion,Äù experiments of infant marmosets. Although the analyses are still ongoing, we would like to show our current results and appreciate any input from the session participants

INNATE SOCIAL BEHAVIOR: AGGRESSION, SEXUAL BEHAVIOR, PARENTAL BEHAVIOR

COMPARING HUMAN AND MONKEY NEURAL CIRCUITS FOR PROCESSING VISUAL SOCIAL SCENES

Julia Sliwa, CNRS, France

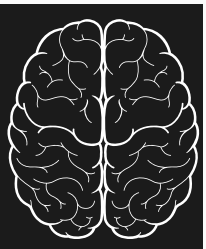
Recognizing agents, their actions, and their interactions is essential for understanding the world around us. Using functional Magnetic Resonance Imaging, we discovered in the macaque monkey brain a network of areas centered on the medial and ventrolateral prefrontal cortex that is selectively engaged in social interaction analysis. Its extent and location suggest that this function is an evolutionary forerunner of human mind-reading capabilities. A comparative fMRI investigation in humans additionally revealed which neural strategies adapted to the needs of each species, and emphasized human interest in understanding actions of our peers directed towards objects. Together these studies show how our primate brains continuously decode the complex visual scenes unwinding in front of us: both the nature of material entities, such as individuals and objects, and their immaterial interactions.

ESTROGEN RECEPTOR BETA NEURONAL NETWORK IN THE REGULATION OF SOCIAL BEHAVIORS IN MICE

Sonoko Ogawa, University of Tsukuba, Japan

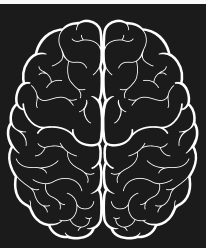
We have been studying the neuroendocrine mechanisms of social behavior by focusing on the role of the two types of estrogen receptors, ERa and ERb. In a series of knockout and knockdown studies, we have concluded that the two types of ERs are differentially involved in the estrogenic regulation of social behavior in both sexes. In contrast to ERa-dependent action, the neuronal mechanisms of ERb action are still not well understood. Our analysis in the ERb-RFPtg mouse line revealed a differential distribution of ERb from ERa at the ‚Äúcellular level‚Äù in each of the ERb-rich brain regions in the social behavior neural network, such as the medial amygdala (MeA), lateral septum, and midbrain dorsal raphe nucleus (DRN). Therefore, we have investigated the functions of ERb-expressing neurons with the use of chemogenetic manipulation as well as fiber photometry recording of neuronal activity in newly developed ERb-iCre mice. A series of studies for the establishment of sexual preference in male mice identified differential regulation of receptivity-based and sex-based preference by ERb-expressing neurons in the posterodorsal MeA (MeAPD) as well as the principal part of the bed nucleus of the stria terminalis as a primary projection site of MeApd-ERb-positive neurons. A separate line of investigation in female ERb-iCre mice revealed that ERb-expressing cells in the DRN may be involved in the inhibitory regulation of female sexual behavior induced by ERa-mediated estrogen action. These findings collectively suggest that ERb-expressing neurons in the social behavioral neural networks play a significant role in the adaptive expression of social behavior in both male and female mice

DAY 3 AT A GLANCE



Wednesday March 27, 2024	
8:30 - 9:10	**Coffee, snacks** (Registration 8:30-12)
9:10-10:50	**Session 5** *A cross-species perspective on how the emotional state of others influences the state and decisions of observers*
9:10 - 10:00	Valeria Gazzola and christian Keysers, Netherlands Institute for Neuroscience, Netherlands
10:00-10:25	Yasushi Kiyokawa, University of Tokyo, Japan
10:25 - 10:50	Rui Oliveira, ISPA Instituto Universitário, Portugal
10:50 - 11:10	**Coffee/snacks**
11:10 - 11:40	**Keynote** **SHIHUI HAN** *Psychological and neural nature of race in face perception*
11:45 - 12:10	**Award Talk** **EMILIE CASPAR** *The Neuroscience of (Dis)obedience*
12:10 - 12:20	**Group Meeting Photo**
12:20 - 1:30	**Lunch + Poster Session 2**
1:30-3:10	**Session 6** *Social and physical pain and emotions*
1:30 - 1:55	Rei Akaishi, RIKEN, Japan
1:55 - 2:20	Marco Venniro, University of Maryland, USA
2:20 - 2:45	Xiaohong Xu, Institute of Neuroscience, China
2:45 - 3:10	Ann Meulders, Maastricht University, Netherlands
3:10 - 3:30	**Coffee/snacks**
3:30-5:10	**Session 7** *Oxytocin and social cognition – relevance for mental health*
3:30 - 3:55	Valery Grinevich, Heidelberg University, Germany
3:55 - 4:20	Christine Stubbendorff, Istituto Italiano di Tecnologia, Italy
4:20 - 4:45	Mary R. Lee, National Institutes of Health, USA
4:45 - 5:10	Adam Guastella, University of Sydney, Australia
5:10 - 5:30	**Break, Happy Hour**
5:30 - 5:40	**Data Blitz**
5:40 - 7:30	**Poster Session 2** **Drinks, Happy Hour**

DETAILED SCHEDULE: DAY 3



WEDNESDAY, MARCH 27, 2024

8:30-9:10 **Coffee, Breakfast**

Come early and mingle in the main lobby

SYMPOSIA V

9:10-10:50 **A CROSS-SPECIES PERSPECTIVE ON HOW THE EMOTIONAL STATE OF OTHERS INFLUENCES THE STATE AND DECISIONS OF OBSERVERS**

9:10-10:00 *A cross-species approach to the neural bases of emotional contagion and prosociality*

Valeria Gazzola and Christian Keysers, Social Brain Lab, Netherlands Institute for Neuroscience, KNAW, The Netherlands; Brain & Cognition, Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands

10:00-10:25 *Social buffering of conditioned fear responses in rats: Relief provided by conspecifics*

Yasushi Kiyokawa, University of Tokyo, Japan

10:25-10:50 *Social transmission of alarm states in zebrafish: mechanisms and evolutionary perspectives*

Rui Oliveira, ISPA Instituto Universitário, Portugal

10:50-11:10 Coffee

DETAILED SCHEDULE: DAY 3

WEDNESDAY MARCH 27, 2024

KEYNOTE: SHIHUI HAN

11:10-11:45 **PSYCHOLOGICAL AND NEURAL NATURE OF RACE IN FACE PERCEPTION**

EARLY CAREER AWARD: EMILIE CASPAR

11:45-12:10 **THE NEUROSCIENCE OF (DIS)OBEDIENCE**

12:10-1:30 **LUNCH BREAK**

SYMPOSIA VI

1:30-3:10 **SOCIAL AND PHYSICAL PAIN AND EMOTIONS**

1:30-1:55 *Expanding relevant computational scales for human brains in society*
Rei Akaishi, RIKEN, Japan

1:55-2:20 *Norepinephrine mediates volitional reciprocal social interactions*
Marco Venniro, University of Maryland, USA

2:20-2:45 *Esr1 sculpts the brain circuitry for aggression in male mice*
Xiao-Hong Xu, Shanghai Center for Brain Science and Brain-Inspired Intelligence Technology, China

2:45-3:10 *The effect of social context on experimental pain and pain-related fear learning*
Ann Meulders, Maastricht University, Netherlands

DETAILED SCHEDULE: DAY 3

WEDNESDAY MARCH 27, 2024

3:10-3:30 Coffee

SYMPOSIA VII

3:30-5:10 **OXYTOCIN AND SOCIAL COGNITION – RELEVANCE FOR MENTAL HEALTH**

3:30-3:55 *Oxytocin facilitates social behavior through axo-axonic interneurons in the rat prefrontal cortex*
Valery Grinevich, Heidelberg University, Germany

3:55-4:20 *Social cognition in 22qll.2 schizophrenia mouse model – does oxytocin play a role?*
Christine Stubbendorff, Istituto Italiano di Tecnologia, Italy

4:20-4:45 *Targeting the oxytocin system in monkeys and humans: evidence for oxytocin as a potential treatment for addiction*
Mary R. Lee, National Institutes of Health, USA

4:45-5:10 *TBA*
Adam Guastella, University of Sydney, Australia

5:10-5:30 BREAK, HAPPY HOUR

5:30-5:40 DATA BLITZ TALKS

Ventromedial prefrontal neurons represent self-states shaped by vicarious fear in mice.
Ziyan Huang, University of Tokyo

Change in the foraging strategies in freely moving rhesus monkey dyads
Ayuno Nakahashi, German Primate Center

Neural computations underlying pragmatic reasoning in referential communication
Shanshan Zhen, City University of Hong Kong

A comparative analysis of theory of mind computations in large language models and single neurons in the human brain.
Mohsen Jamali, Harvard Medical School

DETAILED SCHEDULE: DAY 3

WEDNESDAY, MARCH 27, 2024

5:40-7:30 POSTER SESSION II & HAPPY HOUR

POSTER # TITLE, AUTHOR INFO

1 **Propensity to revenge: a fNIRS study on forgiveness and dark factors of personality**
A. Upravitelev, M. Makarova, M. Petrov, E.Shugarova, N. Meloyan, A. Kurpatov, N. Volkova. HSE University, University of Trento, SBER

2 **An Integrative Model of Information Sharing Decisions: Semantic features, neural correlates, and affective experience**
B. Dore, S. Balny D'Avricourt. McGill University

3 **Neural coordination underlying altruistic behavior in the social brain**
A. Mazza, A. Valvo, I. Mirlisenna, N. A. Fagan, S. W. C. Chang, O. Dal Monte
University of Turin, Yale University

4 **Insula and anterior prefrontal cortex mediates emotional and reasoning processes respectively in moral decision-making**
Y.Liu, M.Sugiura. Tohoku University

5 **Adaptation of the Carbon Emission Task to fMRI settings**
M. Wierzba, D. Zaremba, B. Kossowski, M. Wypych, K. Jednoróg, J. Michałowski, C.A. Klöckner, A. Marchewka. Nencki Institute of Experimental Biology, University SWPS, Norwegian University of Science and Technology

6 **Change in the foraging strategies in freely moving rhesus monkey dyads**
Z. Ahmed, I. Lacal, A. Nakahashi, A. Gail. German Primate Center, Leibniz Science Campus Primate Cognition, University of Göttingen, Bernstein Center for Computational Neuroscience

7 **Effects of Interoceptive Brain Processing on Moral Decision-Making**
S. Cui, and T, Nakano. Osaka University, Center for Information and Neural Networks

8 **Socially influenced preference revaluation: Insights from rat studies**
J. Dören, S. Schäble, S. Troßbach, C. Korth, T. Kalenscher. Heinrich Heine University Düsseldorf

9 **Neural Mechanisms Underlying the Enhanced Cooperation Induced by Multicultural Experience**
Lingyu Meng. University of Sheffield

DETAILED SCHEDULE: DAY 3

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5:40–7:30 POSTER SESSION II & HAPPY HOUR

POSTER # TITLE, AUTHOR INFO

10 **Neural signatures underlying dilemma moral judgment and non-dilemma moral evaluation**
R. Yu. Hong Kong Baptist University

11 **The formation of free-riders from mouse groups in a reward-threat conflict situation is related to their mPFC-BLA-NAc activity**
Jaehyun Lee, Gyu-Hwan Lee, Seoyoung Kim, Jaehoon Kim, Jee Hyun Choi
Korea Institute of Science and Technology, Seoul National University; Korea Development Institute

12 **Possible Involvement of Familiarity in Collective Decision-making in Response to Visual Threat Signal in Medaka Fish**
R. Nakahata, H. Takeuchi. Tohoku University

13 **Functional role of prediction in empathy for pain**
Y. Deng, S. Han. Peking University

14 **Do we empathize humanoid robots and humans in the same way?**
T. Wu, S. Han. Peking University

15 **Individual Differences in Neurophysiological Correlates of Moral Transgression**
S. C. Kao, C. Y. Chen, Y. T. Fan, Y. C. Chen, Y. W. Cheng. National Yang Ming Chiao Tung University, Taipei Medical University, Yuan Ze University, National Taiwan University of Sport

16 **Disentangling the physiological and cognitive pathways of fear and anxiety**
LZ. Gruber, M. Wilf, M. Ramot. Weizmann institute of Science, Rehovot, Israel

17 **Brain Responses to Emotional Climate Change Stories**
D. Zaremba, B. Kossowski, M. Wypych, K. Jednoróg, J. M. Michałowski, C.A. Klöckner, M. Wierzba, A. Marchewka. Nencki Institute of Experimental Biology. University SWPS . Norwegian University of Science and Technology

18 **Ventromedial prefrontal neurons represent self-states shaped by vicarious fear in mice**
Z. Huang, M. Chung, K. Tao, A. Watarai, M.Y. Wang, H. Itoh, T. Okuyama. University of Tokyo

DETAILED SCHEDULE: DAY 3

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5:40-7:30 POSTER SESSION II & HAPPY HOUR

POSTER # TITLE, AUTHOR INFO

19 **Selective inhibition of oxytocin receptor expressing neurons in anterior cingulate cortex disrupts consoling in male and female prairie voles**
S.A. Blumenthal, K. Horie, K. Inoue, L.J. Young. Emory University

20 **Imminence of predator threat detected through the accessory olfactory system in mice**
Q. A. T. Nguyen, A. Rocha, Y. Yamashita, R. Chhor, C. Stadler, C. Pontrello, S. Haga-Yamanaka. University of California, Riverside

21 **Functional connectivity in emotional ambiguity processing: a multimodality perspective and clinical implication**
S. Sun, H. Yu, R. Yu, S. Wang. Tohoku University, University of California Santa Barbara, Hong Kong Baptist University, Washington University in St. Louis

22 **Inhibitory parvalbumin neurons in the insular cortex process the information of social behavior**
S. Fujima, M. Sato, N. Nakai, Toru Takumi Kobe University

23 **A genome-wide association study for subjective well-being in Japanese population**
K. Ishii, S. Nogawa, S. Takahashi, M. Matsunaga, Y. Noguchi, H. Yamasue, Y. Ohtsubo. Nagoya University, Genequest Inc., Genequest Inc., Aichi Medical University, Kobe University, Hamamatsu University School of Medicine, University of Tokyo

24 **Avatar versus human in pain: effects of state empathy on socially induced hypoalgesia using immersive virtual reality**
J. Clark, C. Bellei-Rodriguez, Y. Wang, L. Watson, JM. Heagerty, S. Li, B. Brown, A. Varshney, R. Shafir, L. Colloca. University of Maryland Baltimore, University of Maryland College Park

25 **Involvement of Anterior Cingulate Cortex in emotional contagion in mice, measured using functional Ultrasound Imaging**
F. Nelissen, C. Qin, R. Waasdorp, A. Lotfi, C. Rojas, L. De Angelis, P. Kruizinga, D. Maresca, C. Keysers, B. Heiles V. Gazzola. Netherlands Institute for Neuroscience, University of Amsterdam, Delft University of Technology, Erasmus Medical Centre

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POSTER # TITLE, AUTHOR INFO

26 **Neural mechanisms underlying memories for others whose impressions of trustworthiness were updated**
D. Kurihara, T. Nishioka, M. Mihara, S. Iwata, P. Park, T. Tsukiura. Kyoto University, Hirosaki University

27 **Development of a system enabling a detailed behavioral tracking during the naturalistic communication among animals**
M. Fujibayashi, K. Abe. Tohoku University

28 **Effects of group-based operant task experience on dominance hierarchy in male mice**
R. Iwabuchi, T. Setogawa, M. Nakata. University of Tsukuba, University of Toyama

29 **Socially Induced Placebo Effects Are Blocked by Naloxone - A Mixed Experimental Approach**
N. Raghuraman, L. Colloca. University of Maryland

30 **Implicit racial bias moderates the impact of self-reported race/ethnicity on socially induced placebo analgesic effects**
C.-É. Belleï-Rodriguez, N. Raghuraman, J. N. White, L. Watson, R. Shafir, Y. Wang, L. Colloca. University of Maryland

31 **Pre-registration: Endogenous opioid modulation of threat and safety learning in healthy humans**
I.M. Meier, A. Willems, J. Haaker, B. Vervliet, S. Leknes. Oslo University Hospital, KU Leuven, University Hospital Hamburg Eppendorf, University of Oslo

32 **Memory misattribution between self and other**
X. He. Tohoku University

33 **Conditional knockout of Shank3 by in vivo genome-editing in the ventral CA1 impairs social memory**
M. Chung, K. Imanaka, Z. Huang, A. Watarai, M.-Y. Wang, K. Tao, H. Ejima, T. Aida, G. Feng, T. Okuyama. The University of Tokyo, Massachusetts Institute of Technology

34 **The representation of conspecific sex in ventral hippocampal social memory**
K. Tao, A. Watarai, T. Okuyama. The University of Tokyo

35 **Social and Non-social Reward Representations in the Basolateral Amygdala**
J. L. Javier, J. Isaac, M. Murugan. Emory University

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POSTER # TITLE, AUTHOR INFO

36 **Estrogen receptor beta positive neurons in the medial amygdala regulates male preference towards receptive female odors**
S. Takenawa S. Ogawa. University of Tsukuba

37 **Excitation of estrogen receptor β-expressing neurons in the lateral septum inhibits social anxiety in male mice**
K. Hasunuma, M. Nakata, S. Ogawa. University of Tsukuba

38 **Estrogen receptor β in the medial amygdala is necessary for mate preference but not for lordosis in female mice**
L. Kogure, T. Murakawa, T. Hatsukano, S. Takenawa, M. Morishita, H Ishii, M Nakata S. Ogawa. University of Tsukuba

39 **Estrogen receptor β expressing neurons in the dorsal raphe nucleus serve as an inhibitory regulator on the brain network for female receptivity**
T. Murakawa, L. Kogure, K. Hata, S. Ogawa. University of Tsukuba

40 **Vasopressin neurons control mating behavior in zebrafish**
F. Zhi Chua, M.-Y. Chou. National Taiwan University

41 **Immunohistochemical Localization of Oxytocin in the Monodelphis domestica Brainand Relevance to Field of Social Neuroscience**
E. Alaniz, I. Perez, C. Botello, A. Hinojosa, F. Dominguez, J. VandeBerg, M. Gil. University of Texas Rio Grande Valley

42 **Functional Reorganization in the mPFC-BLA-A1 Circuit of Mice following Acute Oxytocin Administration**
Da-Young Jung, Jungyoung Kim, Hio-Been Han, Robert C. Froemke, Jee Hyun Choi. Korea Institute of Science and Technology, Massachusetts Institute of Technology, New York University, Seoul National University

43 **Amygdala Neurons Differentiating Unfamiliar and Familiar Mice to Establish Social Novelty Preferences**
S. Soya, K. Toda, K. Sakurai1, Y. Cherassel, Y. Saitol, M. Abe, K. Sakimura, T. Sakurai. International Institute for Integrative Sleep Medicine (WPI-IIIS), University of Tsukuba, Keio University, Niigata University

44 **Neural correlates of resilience under different operational definitions: A resting-state fMRI study**
A. P. L. Tai, X. Geng, M. Leung, W. K. W. Lau. The Education University of Hong Kong

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45 **The influence of contextual factors and rater reliability on the quantification of social behavior of Monodelphis domestica, a non-traditional animal model for neuroscience research**
B. Camacho, A. Ramirez, G. Padilla, F. Dominguez, J.L. Vandeberg, M. Gil. University of Texas Rio Grande Valley

46 **Searching for Dedicated Social Cognition Network**
M. Zamberg Elad, M. Ramot. Weizmann Institute of Science
.

47 **Exploring pupil response typicality during naturalistic viewing of social and non-social videos**
M. Wilf, M. Zamberg-Elad, M. Ramot. Weizmann Institute of Science

48 **Perceptual crossing paradigm as a method to study second-person neuroscience: an EEG hyperscanning study**
F. Putri, L. Zapata-Fonseca, S. Lerique, S. Estelle, S. Hayashi, T. Morrissey, B. Morrissey, T. Froese. Okinawa Institute of Science and Technology.

49 **The effects of cleft lip/palate and subsequent repair on the neural processing of infant faces**
A.C. Hahn, R. Kee, K.J. Jantzen. California Polytechnic Institute Humboldt, Western Washington University

50 **Pain sensitivity is decreased during heavy metal music festival**
L. Schneider, T. Fritz. Max Planck Institute for Human Cognitive and Brain Sciences

51 **Tactile discrimination is associated with social touch preference in two cross-cultural cohorts**
H. Powell, J. He, K. Magnani, R. Bessler, N. Puts. King's College London

52 **Effects of interaction with virtual dogs on negative mood and oxytocin secretion**
H. Goto, A. Yoshimura, A. Li, M. Wang, H. Tanaka, A. Shimotomai, F. Krueger, H. Takagishi. Senshu University, Tamagawa University, Senshu University, George Mason University

53 **Rapid and Remarkably Plastic Body Coloration Changes in Oryzias celebensis as a Social Signal Influenced by Environmental Background**
R. Ueda, S. Ansai, H. Takeuchi. Tohoku University, Kyoto University, Tohoku University

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54 **The modulation of pupil size and facial mimicry in response to social stimuli requires conscious awareness**
C. Dapor, D. Ruzzante, F. Meconi, I. Sperandio. University of Trento

55 **The relationship among subjective hyperacusis responses, sensory issues, sensitivity to reward and punishment, and anxiety in adults**
N. Nagahama, M. Nakata. University of Tsukuba

56 **The relationship between attention deficit hyperactivity disorder (ADHD) traits and fatigue induced by daily life activities in adults**
Sou Koshimizu, Naano Nagahama, Tsuyoshi Setogawa, Mariko Nakata. University of Tsukuba, University of Toyama

57 **Alexithymia, not autism, modulates atypical cognitive modulation of pain experience**
E. Ichijo, MP. Coll, C. Catmur, G. Bird. University of Oxford, University of Edinburgh, Université Laval, King's College London

58 **Oxytocin-induced increases in cytokines and clinical effect on the core social symptoms of autism**
T. Wakuda, S. Benner, Y. Uemura, T. Nishimura, M. Kojima, M. Kuroda, K. Matsumoto, C. Kanai, N. Inada, T. Harada, Y. Kameno, T. Munesue, J. Inoue, K. Umemura, A. Yamauchi, N. Ogawa, I. Kushima, S. Suyama, T. Saito, J. Hamada, Y. Kano, N. Honda, S. Kikuchi, M. Seto, H. Tomita, N. Miyoshi, M. Matsumoto, Y. Kawaguchi, K. Kanai, M. Ikeda, I. Nakamura, S. Isomura, Y. Hirano, T. Onitsuka, N. Ozaki, H. Kosaka, T. Okada, H. Kuwabara, H. Yamasue. Hamamatsu University, National Institute for Environmental Studies, National Center for Global Health and Medicine, The University of Tokyo, Kanazawa Institute of Technology, Wayo Women's University, Teikyo University, Kanazawa University, Nagoya University, Hokkaido University, Tohoku University, Osaka University, Kyushu University, University of Miyazaki, University of Fukui

59 **Cultural contexts in neurodegenerative disorders: Exploring associations between living conditions, social factors, and biomarkers among Hispanic subgroups**
I. Perez, L. Pena Márquez, C. Botello, E. Alaniz, F. Domínguez, M. Gil, N. Alliey-Rodriguez. University of Texas Rio Grande Valley

60 **Psychiatric symptoms are associated with poor performance and enhanced metacognition in computationally complex decisions**
X. Lu, K. Keidel, U. Ettinger, C. Murawski, S. Suzuki. The University of Melbourne, University of Bonn, Hitotsubashi University

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61 **Measuring stress in fish: the light/dark test in marine medaka Oryzias melastigma**
D. Goncalves, A. Lebel. University of Saint Joseph

62 **Behavioral assessment and biomarker development for characterization of a marmoset model of autism spectrum disorder**
M. Nakamura, A. Nakagami, M. Yasue, T. Sato, N. Kawai, N. Ichinohe
National Institute of Neuroscience, Tokyo University of Agriculture and Technology, Nagoya University

63 **Preregistration: Impact of childhood social stress on drug effects in young people entering residential treatment for substance use problems**
M. Carlyle, H. Aasterud, E. Falkenberg Kjøde, S. Leknes, L. Hides. University of Queensland; University of Oslo

64 **Social stimulus generalization in animal models for schizophrenia**
K. Oshima, T. I. Shiramtsu, H. Takahashi. The University of Tokyo

65 **The brain structural difference related to grandparenting in healthy seniors : The interaction with biological sex**
J. Kang, Y. H. Hwang, S.G. Lee, S. Kim, C. Shin. Korea University, Empathy Research Institute

66 **Sex-specific differences in behaviour after exposure to microplastics in the marine medaka Oryzias melastigma**
S. D. Cardoso, I. H. Lau, D. Gonçalves. Institute of Science and Environment, University of Saint Joseph

67 **Calcium signaling in the nucleus accumbens during social interactions in male and female Syrian hamsters**
J.M. Borland, P.E. Rothwell, R.L. Meisel. University of Minnesota

68 **Transcriptional bases of different social bonds**
L. Brusman, A. Fultz, R. Dowell, M. Allen, Z. Donaldson. University of Colorado Boulder

69 **Loneliness Syndrome of Youth : Concept Mapping**
E. Lee, J. Kim. Duksung Women's University

70 **A single 60-minute exposure to alcohol impairs the social behavior of adult zebrafish**
S.Hurst, M. Rampersad, M. Mofle, Y. Fernandes. University of South Dakota

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WEDNESDAY, MARCH 27, 2024

5:40-7:30 POSTER SESSION II & HAPPY HOUR

POSTER # TITLE, AUTHOR INFO

71 **Neurocircuitry of the oxytocin-oxytocin receptor system in rats facilitating attachment formation to human hands**
H. Hayashi, H. Sakamoto. Okayama University

72 **A comparative analysis of theory of mind computations in large language models and single neurons in the human brain**
M. Jamali, Z. Williams, J. Cai. Massachusetts General Hospital, Harvard Medical School

73 **Neural computations underlying pragmatic reasoning in referential communication**
Shanshan Zhen, Mario Martinez-Saito, Rongjun Yu. City University of Hong Kong, National University of Singapore, Hong Kong Baptist University

74 **Predictability alters information flow during action observation in human electrocorticographic activity**
C Qin , F Michon , Y Onuki , Y Ishishita , K Otani , K Kawai , P Fries , V Gazzola, C Keysers Netherlands Institute for Neuroscience, Jichi Medical University, Ernst Strüngmann Institute (ESI) for Neuroscience in Cooperation with Max Planck Society, Donders Institute for Brain, University of Amsterdam

75 **Observer-agent kinematic similarity modulates neural activity in regions of the action observation network**
B.A. Schuster, Y. Kurihara, A. Tsuchiya, K. Nakagawa, Y. Okamoto, R. Osu
Waseda University, University of Vienna

76 **Representation of behaviour of other idividuals: A novel task in preschool children**
T. Nekovarova, P. Eretova, P. Skalnikova. National Institute of Mental Health, Klecany, Czech Republic

77 **Introducing an open dataset to examine single-dose intranasal oxytocin effects in healthy younger and older adults**
M. Horta, R. Polk, N.C. Ebner. University of Florida

78 **Validation of an innovative task to assess decision making in bribery situations**
E-E. Oviedo-Rodríguez, A. Reyes-Aguilar, M. Delgado-Herrera, D. Montaño-Castro, F. Barrios-Alvarez, National Autonomous University of Mexico

79 **Roles of the default mode network modulated by levels of the sense of agency during future thinking and autobiographical memory retrieval**
K. Ohkubo, Y. Masuda, M. Mihara, A. Kamo, W. Teramoto, T. Tsukiura
Kyoto University, Japan Society for the Promotion of Sciences, Kumamoto University

A CROSS-SPECIES PERSPECTIVE ON HOW THE EMOTIONAL STATE OF OTHERS INFLUENCES THE STATE AND DECISIONS OF OBSERVERS

A CROSS-SPECIES APPROACH TO THE NEURAL BASES OF EMOTIONAL CONTAGION AND PROSOCIALITY

Valeria Gazzola and Christian Keysers, Social Brain Lab, Netherlands Institute for Neuroscience, KNAW, The Netherlands; Brain & Cognition, Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands

In this interactive talk, we will ask how does our brain make us feel what others feel? How does it motivate us to help others? We will start from the observation that in humans, the somatosensory, insular and cingulate cortices are activated both when experiencing pain and while witnessing other do so. Through a series of human and rodent examples we will then ask whether such vicarious activations have causal influences on sharing the emotions of others and on deciding to help them. We will leverage invasive methods to show that signals in the human insula indeed quantitatively represent the pain of others, and that in the rodent cingulate cortex, neurons responding to the animal's own pain become reactivated when witnessing the pain of others. In the light of these findings in rodents and humans, and the homologies in their brain circuitry, we will suggest that emotion sharing is an evolutionarily conserved mechanism that allows animals and humans to better prepare for yet unseen dangers by tuning into the state of those that have already detected them. Finally, we will present work on psychopathic criminals and healthy volunteers that highlights that although these circuits may be biologically pre-wired, we have control on how much we use them.

SOCIAL BUFFERING OF CONDITIONED FEAR RESPONSES IN RATS: RELIEF PROVIDED BY CONSPECIFICS

Yasushi Kiyokawa, University of Tokyo, Japan

Social variables are known to influence neural, endocrine, and immune outcomes in animals. One example is social buffering, the phenomenon in which the presence of affiliative conspecifics mitigates stress responses. We conducted a series of studies in rats to examine social buffering. When the fear-conditioned subjects were exposed to the conditioned stimulus (CS) alone, conditioned fear responses, including freezing, were observed. However, the presence of an unfamiliar same-sex rat (associate) completely blocked these responses by inhibiting the lateral amygdala, suggesting that social buffering ameliorates conditioned fear responses. Investigation of the characteristics of social buffering revealed that not all rats provided buffering effects to the Wistar subjects. Specifically, Wistar rats and the descendants of Wistar rats acted as social buffers, whereas rats established independently from Wistar rats were found to be non-buffers. We also investigated the signal that mediates social buffering. Because the body odor of the social buffers alone was sufficient to induce social buffering, we searched for the responsible chemical in the odor. Subsequent analyses revealed that 2-methylbutyric acid alone was sufficient to induce social buffering in both laboratory rats and wild brown rats. Recently, we have started to investigate the neurochemical that mediates social buffering. Preliminary data suggest that opioids, rather than oxytocin and other neurochemicals, are important for social buffering. We believe that the accumulation of materialistic evidence enables us to understand social buffering from a cross-species perspective, which would support the notion that there are subjective feelings in rats (relief provided by particular strains of rats).

A CROSS-SPECIES PERSPECTIVE ON HOW THE EMOTIONAL STATE OF OTHERS INFLUENCES THE STATE AND DECISIONS OF OBSERVERS

SOCIAL TRANSMISSION OF ALARM STATES IN ZEBRAFISH: MECHANISMS AND EVOLUTIONARY PERSPECTIVES

Rui Oliveira, ISPA Instituto Universitário, Portugal

Using social information to survey the presence of danger in the environment and adjust the behavior and internal state accordingly is an highly adaptive social ability that group living animals are expected to evolve. Using zebrafish as a model to study the presence of such social abilities in a vertebrate divergent evolutionary branch from that of tetrapods, we have shown that both social buffering and social contagion of alarm responses are present in this species. Using mutants for the ligand of the fish oxytocin nonapeptide and both of its receptors we showed that: (1) oxytocin is both necessary and sufficient for observer zebrafish to copy the alarmed/relaxed behavior of conspecific demonstrators; (2) a ventral forebrain circuit is associated with emotional contagion and buffering in zebrafish that receives direct oxytocinergic projections from the pre-optic area; and (3) social transmission of fear in zebrafish is based on emotional contagion rather than motor mimicry. Together these results suggest an evolutionary conserved role of oxytocin on social fear transmission. Finally, using artificial selection we were successful to create a highly social zebrafish line only after 3 generations, and we have shown that this line has enhanced social contagion, indicating a rapid evolutionary response of this social ability to selection for sociality.

SOCIAL AND PHYSICAL PAIN AND EMOTIONS

EXPANDING RELEVANT COMPUTATIONAL SCALES FOR HUMAN BRAINS IN SOCIETY

Rei Akaishi, RIKEN, Japan

We, humans, lives in society by shaping the environment and by being shaped by the environment. The intricate interactions with the social and non-social have been recognized to be an important factor to understand our mind and the brain. However, the relevant scales of time, space, and social aspects of the environment for human brains still remains uncertain. In this talk, I will present the efforts of expanding the scales of computations in the human brain, exploring with its relevant social scales. I will specifically talk about the studies of the issues of trust and wellbeing with the concept of relational mobility and its implementations in the experimental fMRI studies with network-based prisoner's dilemma tasks. The results of the experiments revealed that people become more cooperative with increasing group size in the context of flexible social structure. Careful analysis with computational models showed that people used more tolerant strategies with increasing groups size as a result of interaction between stable cooperative tendency and dynamic reciprocal strategies and these mechanisms are implemented in the brain regions integrating computations at multiple time scales.

NOREPINEPHRINE MEDIATES VOLITIONAL RECIPROCAL SOCIAL INTERACTIONS

Marco Venniro, University of Maryland, USA

Human social behavior is a multifaceted phenomenon. When we engage in interactions with others, our actions are motivated and reciprocal, as we continually observe and interpret social cues, adjusting our responses accordingly. The exploration of social behaviors through animal models has emerged as a prominent research area. However, in many existing models, the social interactions are controlled and initiated by either the experimenter or a designated experimental animal, with the social partner playing a passive role. Here, we developed a model wherein both resident and partner rats achieve social interaction by voluntarily coordinating a series of actions. Independent of sex or effort requirements rats consistently exhibited reciprocal engagement in social interactions. Furthermore, norepinephrine selectively mediated reciprocal social interactions. Our findings highlight the significance of exploring the underlying mechanisms that enable reciprocal social interactions to facilitate the translation of this knowledge into promoting healthy interactions and understanding disruptive social behaviors.

SOCIAL AND PHYSICAL PAIN AND EMOTIONS

ESR1 SCULPTS THE BRAIN CIRCUITRY FOR AGGRESSION IN MALE MICE

Xiao-Hong Xu, Shanghai Center for Brain Science and Brain-Inspired Intelligence Technology, China

Developmental estrogen signaling instructs male-typical aggression patterns, yet the underlying neural circuit mechanisms remain unclear. Utilizing a newly developed mouse line, we selectively eliminated estrogen receptor 1 (Esr1) from attack-promoting neurons in the ventromedial hypothalamus (VMH) while mapping the connectivity of Esr1-deleted cells. We found that developmental Esr1 deletion has sex-specific effects on synaptic inputs from aggression-relevant brain areas onto VMH attack-promoting neurons. Our analysis revealed the posterior intralaminar thalamic nucleus (PIL) as an previously overlooked attack-promoting site upstream of VMH. Moreover, VMH neurons in Esr1-deleted males exhibit significantly reduced intrinsic excitability, hindering their ability to drive attacks. Conversely, perinatal estrogen treatment in females masculinized the connectivity and firing rates of VMH neurons, enabling these cells to promote male-like attack behavior toward intruders upon stimulation. This study sheds light on estrogen's pivotal role in sculpting male aggression circuitry, advancing our understanding of sex-specific neural circuit development in mammals.

THE EFFECT OF SOCIAL CONTEXT ON EXPERIMENTAL PAIN AND PAIN-RELATED FEAR LEARNING

Ann Meulders, Maastricht University, Netherlands

Pain is ubiquitous, subjective, and exceedingly complex. From early in life, we experience acute pain (injuries, vaccinations). By adolescence, chronic pain affects 1 in 5 individuals, disrupting nearly every domain of development and functioning. While the etiology of chronic pain is unknown, the biopsychosocial model has dominated the field with research disproportionately focusing on neurobiological factors, to a lesser extent, psychological factors, but largely ignoring the social dimension. Yet, we are a social species: others are around when we experience pain, and we learn from others about pain (social/ observational learning). In this talk, I will (1) review our previous work on the effect of social threat on pain experience, pain expression, pain-related fear learning, and interpersonal dynamics using experimental pain paradigms, (2) present a study investigating the effect of observing others in high vs. low pain during high-frequency electrical stimulation (HFS) on subsequent pain experience during HFS and pinprick mechanical hypersensitivity, (3) present new data on the buffering effect of digital social support (or online social interaction) on pain intensity, unpleasantness, pain tolerance and recovery in a cold pressor task.
Findings suggest that: (1) social threat increases pain reports and pain-related fear, and decreases facial pain expression, (2) observing others in high pain increases pain-related fear and pain ratings during HFS, slightly increases the perceived intensity of the mechanical pinprick stimulus, but not the unpleasantness or the length of the area, (3) (digital) social support may decrease pain intensity, increase pain tolerance, and speed up recovery during acute pain.

OXYTOCIN AND SOCIAL COGNITION – RELEVANCE FOR MENTAL HEALTH

OXYTOCIN FACILITATES SOCIAL BEHAVIOR THROUGH AXO-AXONIC INTERNEURONS IN THE RAT PREFRONTAL CORTEX

Valery Grinevich, Heidelberg University, Germany

The neuropeptide oxytocin (OT) has attracted great attention of the general public, basic neuroscience researchers, psychologists and psychiatrists due to its profound pro-social and anxiolytic effects. During the last decade, substantial progress has been achieved in understanding the complex neurobiology of the brain oxytocin system. However, the picture of oxytocin actions remains far from being complete, and the central question remains: How does a single neuropeptide exert such pleotropic actions? In my talk, I will tackle this question, demonstrating the anatomical divergence of oxytocin neurons, their multiple central projections, and distinct oxytocin-sensitive cell types in different brain regions, primarily focusing on the medial prefrontal cortex (mPFC). More specifically, I will demonstrate the direct axonal projections of OT-neurons originating in the hypothalamus to the mPFC in adult female rats. Next, I will show the existence of two types of OT receptor (OTR) expressing neurons, which are intrinsically activated during social interaction. Further I will show that opto- or chemogenetic activation of the largest population of OTR+ neurons in the mPF , axo-axonic interneurons, increases social interactions as well as induces the shift in preference of rats from appetitive stimuli towards social subjects. The work in progress suggests that OTR+ axo-axonic cells exerts biased inhibition of PFC principle neurons projecting to the basolateral amygdala and in turn potentially reducing anxiety level. Due to the fact that OTRs are predominantly expressed in cortical interneurons, the mechanism of their biased modulation of principle cells projecting to subcortical social, reward or anxiety related areas may explain the coherent prosocial action of OT via the mPFC.

SOCIAL COGNITION IN 22QLL.2 SCHIZOPHRENIA MOUSE MODEL – DOES OXYTOCIN PLAY A ROLE?

Christine Stubbendorff, Istituto Italiano di Tecnologia, Italy

Schizophrenia is associated with impairment of social cognition and social function. Medial prefrontal cortex (mPFC) is crucial for processing of social cues and regulation of social behaviour. 22q11.2 deletion syndrome is one of the largest known genetic risk factors for developing schizophrenia and is associated with impairments to social recognition and emotion processing. Oxytocin (OXT) is pivotal to social recognition and social function and inactivation of mPFC OXT receptors impairs social recognition in mice comparable to social cognition deficits in schizophrenia. The 22q11.2 deletion mouse model (LgDel) displays impairments to social memory and emotion recognition and mice display altered mPFC neuronal activity patterns during cognitive tests and brain OXT levels are lower in LgDel compared to wild type mice. These findings suggest that social cognitive deficits in schizophrenia could be caused by altered OXT availability within mPFC. To examine this, WT and LgDel mice were injected with a novel OXT biosensor in mPFC and OXT fluctuations were recorded during social cognitive tasks. In my talk, I will present our preliminary data on this ongoing study.

OXYTOCIN AND SOCIAL COGNITION – RELEVANCE FOR MENTAL HEALTH

TARGETING THE OXYTOCIN SYSTEM IN MONKEYS AND HUMANS: EVIDENCE FOR OXYTOCIN AS A POTENTIAL TREATMENT FOR ADDICTION

Mary R. Lee, National Institutes of Health, USA

Preclinical studies suggest that central endogenous signaling of the nine amino acid peptide, oxytocin (OT) is altered in drug and alcohol addiction. There are preliminary preclinical and clinical studies indicating that administration of OT reduces addiction-related behaviors such as self-administration, conditioned place preference and withdrawal symptoms. As such, OT may represent a novel treatment for alcohol and drug dependence. However, there are still many unanswered questions that limit further clinical development of this promising treatment. The interaction between OT and drugs of abuse on dopamine signaling in mesocorticolimbic pathways where addictive substances exert their reinforcing effects is unknown. It is important to examine effect of OT on drug seeking in primate models of addiction as the brain OT receptor distribution in primates is different from that in rodents. Lastly, the endogenous OT system is altered in substance dependence and these alterations are poorly understood in primate species. We conducted an [11C] raclopride positron emission tomography (PET) study in male rhesus macaques to investigate the effect of systemically delivered OT on [11C] raclopride binding potential in the striatum after an IV methylphenidate (MP) challenge. There was a significant MP X OT interaction such that OT reduced MP-stimulated dopamine concentrations in the dorsal striatum. We also conducted a study of the effect of OT on alcohol consumption in a baboon model of binge drinking, where OT significantly reduced alcohol consumption. Lastly, in a human post-mortem proteomics analysis we found upregulation of OTergic pathways in individuals with alcohol use disorders (AUD), highlighting the potential of OT as a treatment for AUD.

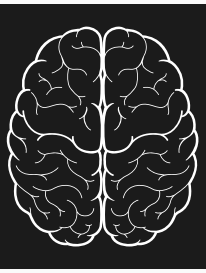
TBA

Adam Guastella, University of Sydney, Australia

DAY 4 AT A GLANCE

Thursday March 28, 2024	
8:30 - 9:10	**Coffee, snacks**
9:10-10:50	**Session 8** *Outside of the ordinary Social Neuroscience - diverse species*
9:10 - 9:35	Matt Lovett Barron, UCSD, USA
9:35 - 10:00	Zoe Donaldson, University of Colorado Boulder, USA
10:00 - 10:25	David Omer, Hebrew University of Jerusalem, Israel
10:25 - 10:50	Kimberley Doell, University of Vienna, Austria
10:50 - 11:10	**Coffee/snacks**
11:10-11:50	**Session 9** *(10 min short talks)*
	Shawn Rhoads, Mount Sinai, USA
	Wataru Toyokawa, University of Konstanz, Germany
	Tara Raam, UCLA, USA
	Malavika Murugan, Emory University, USA
11:50 - 1:30	**Lunch**
1:30-3:10	**Session 10** *Understanding the Behavioral and Neural Dynamics of Naturalistic Social Interactions*
1:30 - 1:55	Yina Ma, Beijing Normal University, China
1:55 - 2:20	Cory Miller, UCSD, USA
2:20 - 2:45	Jumpei Matsumoto, University of Toyama, Japan
2:45 - 3:10	Weikang Shi, Yale University, USA
3:10 - 3:15	**Closing remarks**

DETAILED SCHEDULE: DAY 4



WEDNESDAY, MARCH 28, 2024

8:30-9:10 **Coffee, Breakfast**

Come early and mingle in the main lobby

SYMPOSIA VIII

9:10-10:50 **OUTSIDE OF THE ORDINARY SOCIAL NEUROSCIENCE - DIVERSE SPECIES**

9:10-9:35 *Neurobiology of collective behavior in schooling fish*
Matt Lovett-Barron, UCSD, USA

9:35-10:00 *Transcriptional bases of long-term bonds*
Zoe Donaldson, University of Colorado Boulder, USA

10:00-10:25 *The naming of non-human primates*
David Omer, Hebew University of Jerusalem, Israel

10:25-10:50 *Can social neuroscience contribute to the fight against climate change?*
Kimberley Doell, University of Vienna, Austria

10:50-11:10 Coffee

11:10-11:50 **SHORT TALKS**

DETAILED SCHEDULE: DAY 4

WEDNESDAY, MARCH 28, 2024

SHORT TALKS

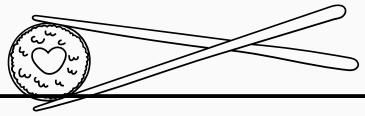
11:10-11:20 *Intracranial neural signatures of social inference and cooperation in human dyads*
Shawn Rhoads, Mount Sinai, USA

11:20-11:30 *Self-organised collective intelligence emerging from conformity*
Wataru Toyokawa, University of Konstanz, Germany

11:30-11:40 *Prefrontal modulation of collective response to environmental challenge*
Tara Raam, UCLA, USA

11:40-11:50 *Approach or avoid ? Deciding what to do with a conspecific*
Malavika Murugan, Emory University, USA

11:50-1:30 **LUNCH BREAK**



SYMPOSIA IV

1:30-1:55 **UNDERSTANDING THE BEHAVIORAL AND NEURAL DYNAMICS OF NATURALISTIC SOCIAL INTERACTIONS**

1:30-1:55 *Intracranial Recording of Interacting Brains Reveal Neurocognitive Dynamics of Human¬†Cooperation*
Yina Ma, Beijing Normal University, China

1:55-2:10 *Representing the dynamics of natural marmoset vocal behaviors in frontal cortex*
Cory Miller, UCSD, USA

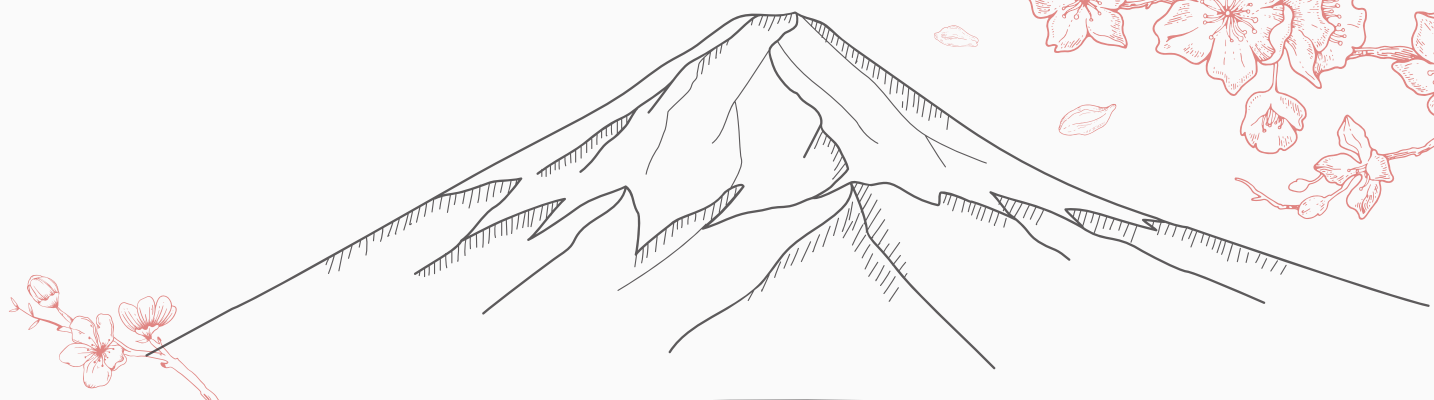
2:10-2:35 *Three-dimensional Markerless Motion Capture of Multiple Freely Behaving Monkeys for Automated Characterization of Social Behavior*
Jumpei Matsumoto, University of Toyama, Japan

2:35-3:10 *Exploring Behavioral and Neural Dynamics in Cooperative Interactions Among Marmoset Dyads*
Weikang Shi, Yale University, USA

DETAILED SCHEDULE: DAY 4

THURSDAY MARCH 28, 2024

3:10–3:15 | CLOSING REMARKS



OUTSIDE OF THE ORDINARY SOCIAL NEUROSCIENCE DIVERSE SPECIES

NEUROBIOLOGY OF COLLECTIVE BEHAVIOR IN SCHOOLING FISH

Matt Lovett-Barron, UCSD, USA

Many animals move in groups, where collective behavior emerges from the interactions amongst individuals. These social interactions produce the coordinated movements characteristic of bird flocks and fish schools, but little is known about their neurobiological basis. Here I will discuss my lab's efforts to characterize the visually-based schooling behavior of the micro glassfish (Danionella cerebrum), whose small size and optical accessibility allow for brain-wide functional imaging of fish engaged in social virtual reality.

TRANSCRIPTIONAL BASES OF LONG-TERM BONDS

Zoe Donaldson, University of Colorado Boulder, USA

Relationships are shaped by reciprocal interaction and feedback between individuals. As relationships mature, pairs share common goals, improve their ability to work together, and experience coordinated emotions. However, the neural underpinnings responsible for this unique, pair-specific experience remain largely unexplored. We used single nucleus RNA-sequencing to examine the transcriptional landscape of the nucleus accumbens (NAc) in socially monogamous prairie voles in long-term peer or mating-based relationships. We identified cell type-specific transcriptional differences between relationship types, including proportional differences in subpopulations of medium spiny neurons and module-based gene expression differences in interneurons. We also identified five gene modules correlated with different facets of social preference behavior across individuals. Finally, we show that, regardless of relationship type, prairie vole pairs exhibit transcription-based synchrony at the level of individual cells. Together, our results are consistent with a model in which a subset of gene expression changes promote relationship type-appropriate behaviors, while other non-overlapping gene expression changes support the social behaviors that are common across affiliative relationships.

THE NAMING OF NON-HUMAN PRIMATES

David Omer, Hebrew University of Jerusalem, Israel

Humans and dolphins are the only known species which vocally label their conspecifics. Until recently, it remained unclear whether non-human primates shared this language-based ability. In our study, we recorded spontaneous 'phee call' dialogues between pairs of marmoset monkeys. We discovered that marmosets utilize these calls to indicate their location and to vocally label other conspecifics. Moreover, they respond more consistently and correctly to calls that are specifically directed at them. Analysis of calls from various monkeys highlighted family group structures, with members of the same family using similar acoustic feature patterns to address others and perform vocal learning. This finding sheds light on the complexities of social vocalizations among non-human primates and suggests that marmoset vocalizations may provide a model for understanding human language, thereby offering new insights into the evolution of social communication.

OUTSIDE OF THE ORDINARY SOCIAL NEUROSCIENCE DIVERSE SPECIES

CAN SOCIAL NEUROSCIENCE CONTRIBUTE TO THE FIGHT AGAINST CLIMATE CHANGE?

Kimberley Doell, University of Vienna, Austria

Can social neuroscience contribute to the fight against climate change? Collectively, human decisions and actions cause climate change, which threatens to significantly degrade our living conditions. Social neuroscience can provide unique insights into understanding why people behave as they do, especially when combined with interdisciplinary multi-method approaches. In this talk, I will first give an overview of how (social) neuroscience can be leveraged in this domain. Then I will present the results from a multi-method experiment (N=62) that combined a social-reward-based functional imaging paradigm, with web-based measurements of psychological antecedents (e.g., biospheric values), to predict the frequency of real-world environmentally relevant positive and negative behaviours measured via ecological momentary assessment. Brain regions responsible for the consumption of appetitive rewards (e.g. the striatum and prefrontal cortex) were not only more active when participants won money for themselves (as opposed to a control condition), but activity in these regions correlated with the frequency in which participants then committed negative environmental behaviours (e.g., taking a long hot shower) in the real world. Conversely, activity in brain regions that have been implicated in the processing of social rewards and salience detection (i.e. the amygdala and precuneus) positively correlated with the frequency of positive environmental behaviours (e.g., eating a vegan meal). These results support the notion that the mechanisms that drive people to engage in ‚Äúgood‚Äù environmental behaviours are not necessarily the same as the mechanisms that drive them to engage in ‚Äúbad‚Äù behaviours while also highlighting the utility of adopting a social neuroscience approach in the context of sustainable decision making. Overall, we shed light on the individual-level dispositions to act to protect, or not to protect, the environment.

SHORT TALK ABSTRACTS

INTRACRANIAL NEURAL SIGNATURES OF SOCIAL INFERENCE AND COOPERATION IN HUMAN DYADS

Shawn Rhoads, Mount Sinai, USA

TBD

SELF-ORGANISED COLLECTIVE INTELLIGENCE EMERGING THROUGH CONFORMIST SOCIAL LEARNINGSELF-ORGANISED COLLECTIVE INTELLIGENCE EMERGING THROUGH CONFORMIST SOCIAL LEARNING

Wataru Toyokawa, RIKEN CBS, JAPAN

Conventional models of collective intelligence rely on individuals making unbiased, at least partially informed decisions. However, animal decision making through repeated experience may often be biassed due to the constraints in information sampling (so-called the hot stove effect). Considering the ubiquity of conformist social learning, a process widely considered to be bias-amplification, it seems paradoxical that improvements in decision-making performance under social influences still prevail. How can animals overcome the potentially suboptimal bias collectively? Here we show, through model analyses and large-scale interactive behavioural experiments with 585 human subjects, that conformist influence can indeed promote favourable risk taking in repeated experience-based decision making, even though many individuals are systematically biassed towards adverse risk aversion. Although strong positive feedback conferred by copying the majority's behaviour could result in unfavourable informational cascades, our differential equation model of collective behavioural dynamics identified a key role for increasing exploration by negative feedback arising when a weak minority influence undermines the inherent behavioural bias. This ‚Äúcollective behavioural rescue‚Äù highlights a benefit of collective learning in a broader range of environmental conditions than previously assumed and resolves the ostensible paradox of adaptive collective behavioural flexibility under conformist influences.

PREFRONTAL MODULATION OF COLLECTIVE RESPONSE TO ENVIRONMENTAL CHALLENGE

Tara Raam, University of California Los Angeles

Many species organize into social groups, in which the individual contributes to and benefits from the well-being of the whole. However, little is known about the neural basis of group behaviors in response to environmental stressors. To address this gap, I study how groups of four mice self-organize into huddles in response to thermal cold stress, using computer vision multi-animal pose estimation tools. I found that huddling behavior is modulated by group size--individual mice huddle more in groups than in pairs, suggesting that social groups have emergent properties not present in pairs. I next asked what decision-making strategies individual mice display to engage or disengage in huddles. I found that individual mice demonstrate active (self-initiated) and passive (partner-initiated) behavioral strategies to enter or leave huddles. Previous work suggests that medial prefrontal cortex (mPFC) is critical for regulating social behaviors, as well as decision making. Using cellular-resolution calcium imaging, I found distinct mPFC populations that encode active and passive decisions, but not generic locomotion. Finally, I used inhibitory chemogenetics to silence principal neurons in mPFC and found that silencing mPFC in two individuals within the group decreases active decisions in those animals. Remarkably, this also has a ripple effect on non-silenced animals in the group. Together, these data suggest a neural mechanism for how individuals take on flexible, adaptive roles within a group and present a novel avenue towards studying collective behavior.

APPROACH OR AVOID ? DECIDING WHAT TO DO WITH A CONSPECIFIC

Malavika Murugan, Emory University, USA

One of the most critical social decisions animals make is approaching or avoiding a conspecific based on the quality of previous interactions. Yet, how we recognize who we are interacting with and how that information is transformed to guide subsequent behavior remains relatively unknown. For instance, mice readily discriminate between novel and familiar conspecific, preferentially spending more time investigating a novel individual than a familiar individual. In rodents, optogenetic and imaging experiments have identified the ventral hippocampus to be causally involved in allowing the animals to distinguish between familiar and novel animals. However, how information about the conspecific identity thought to be primarily encoded in the ventral hippocampus (vHPC) is transformed to drive increased approach and investigation of a novel individual remains unknown. Through optogenetic and chemogenetic experiments we have mapped vHPC projections to the lateral septum (LS) as a potential site of this transformation. Combining optogenetic, chemogenetic, viral intersectional strategies and rabies tracing methods, we have identified a hippocampal-septal-ventral tegmental circuit that allows animals to discriminate novel from familiar animals and engage in social novelty-related approach behaviors. We currently use calcium imaging to understand how this transformation is reflected in the endogenous activity patterns of vHPC and LS neurons.

UNDERSTANDING THE BEHAVIORAL AND NEURAL DYNAMICS OF NATURALISTIC SOCIAL INTERACTIONS

INTRACRANIAL RECORDING OF INTERACTING BRAINS REVEAL NEUROCOGNITIVE DYNAMICS OF HUMAN¬†COOPERATION

Yina Ma, Beijing Normal University, China

Cooperative interactions play a pivotal role in the evolution of social animals and profoundly shape individual and collective behaviors. Successful cooperation requires dynamic tracking and synchronization between cooperating individuals to achieve the collective goal. However, the cooperative behavioral dynamics and neuronal mechanisms underlying cooperation within each individual brain and between interacting brains remain largely unknown. Here we simultaneously recorded intracranial electrophysiological signals from pairs of epilepsy patients who cooperated as teammates in a dynamic, real-time cooperation game. By analyzing the behavioral dynamics of these cooperating dyads, we quantify and dissect the distinct contributions of teammate coordination and collective goal pursuit to the cooperation dynamics. These components contribute predominantly to the initiation and maintenance of cooperation, respectively, with coordination crucial in initiating cooperation and supporting the achievement of collective goals. High-gamma activity in the amygdala and tempo-parietal junction (TPJ) distinguishes between initiation and maintenance cooperation states, and predicts transitions between cooperation states, with TPJ adaptively monitoring dominant cooperation components. High-gamma activity from distinct populations of neurons encoded teammate-coordination and goal-pursuit motives, with populations of TPJ (not amygdala) neurons preferentially tracking dominant motives of different cooperation states. Furthermore, the amygdala and TPJ high-gamma activity synchronizes across cooperating brains in a way that depends on cooperation states and predicts how teammates synchronize their coordination speed. Together, these findings offer insight into the cognitive and neuronal mechanisms underlying real-time, interactive human cooperation, providing a fine-grained understanding of cooperation dynamics as a state-dependent process with distinctive neurocognitive profiles in each state.

REPRESENTING THE DYNAMICS OF NATURAL MARMOSET VOCAL BEHAVIORS IN FRONTAL CORTEX

Cory Miller, UCSD, USA

Natural behaviors vary in their structure, timing, frequency and occurrence. This seemingly indomitable character of ethology has long been a key bottleneck to neuroscience because of the difficulty it poses to explicating the relationship between the sources of this variance and patterns of neural activity. Here we sought to apply a GLM based approach to test how neuronal ensembles throughout the primate frontal cortex ,Äì prefrontal and premotor (PMC) areas ,Äì govern naturally occurring conversations in freely-moving marmosets, a dynamic social interaction involving the coordinated exchange of social signals between pairs of conspecifics. Analyses revealed that our model-based analysis robustly outperformed more traditional PSTH based analyses, as it identified more neurons with significant vocal behavior related functions ,Äì i.e. hearing and producing calls in different social contexts - as well as captured state-related activity in neurons. Moreover, analyses revealed novel functional clusters in marmoset frontal cortex related to the different behavioral and state related properties of social communication distributed in an anatomically heterogenous organization that had not previously been observed in more traditional experiments. These results suggest that primate frontal cortex is intricately involved in governing nearly all facets of natural, continuous vocal behaviors through a distributed pattern of ensemble activity.

UNDERSTANDING THE BEHAVIORAL AND NEURAL DYNAMICS OF NATURALISTIC SOCIAL INTERACTIONS

THREE-DIMENSIONAL MARKERLESS MOTION CAPTURE OF MULTIPLE FREELY BEHAVING MONKEYS FOR AUTOMATED CHARACTERIZATION OF SOCIAL BEHAVIOR

Jumpei Matsumoto, University of Toyama, Japan

Given their high sociality and close evolutionary distance to humans, monkeys are an essential animal model for elucidating the biological mechanisms underlying human social behavior and the pathogenesis of diseases exhibiting abnormal social behavior. However, behavioral analysis of naturally behaving monkeys requires manual counting of various behaviors, which has been a bottleneck due to problems in throughput and objectivity. Here, we developed a three-dimensional markerless motion capture system that utilized multi-view data for robust tracking of individual monkeys and accurate reconstruction of the three-dimensional poses of multiple monkeys living in groups. Validation analyses in two groups of monkeys showed that the system can characterize individual social dispositions and relationships based on automatically detected various social events. Analyses of social looking facilitated the investigation of adaptive behaviors in a social group. These results suggest that the present motion capture system will significantly enhance our ability to analyze primate social behavior.

EXPLORING BEHAVIORAL AND NEURAL DYNAMICS IN COOPERATIVE INTERACTIONS AMONG MARMOSET DYADS

Weikang Shi, Yale University, USA

Social interactions are complex and dynamic, requiring effective communication, outcome evaluation, and adjustment for future interactions. Non-human primates utilize social gaze as a vital means to gather social information during interactions. To explore the significance of social gaze in cooperative interactions, we studied dyadic cooperative interactions in common marmosets (Callithrix jacchus), using a cooperative lever-pulling task in a naturalistic setting. In this task, the marmosets were placed in separate transparent boxes, each with access to a lever and a juice tube. To obtain the juice reward, the animals were required to pull the levers simultaneously in a cooperative manner. Throughout the task, we recorded their behaviors using multiple synchronized cameras. By employing a deep convolutional neural network, DeepLabCut, we tracked and analyzed specific facial parts, including the eyes, ear tufts, forehead, and mouth. This analysis allowed us to define the animals' head gaze direction and examine the dynamics of their gaze behaviors. We quantified the instances both when the marmosets engaged in looking at one another (social gaze,) and when they focused their attention on their own juice tube (reward gaze). With training, all three pairs of marmosets tested exhibited an increased frequency of social gaze, indicating their potential use of social information to successfully complete the cooperation task. Furthermore, we utilized a Dynamic Bayesian Network (DBN) model to investigate the behavioral dynamics encompassing gazes and lever-pulling behaviors. By quantifying the causal relationships between these factors, we discovered an augmented causal influence from social gaze to pulling over time. This result suggests that the marmosets gradually began utilizing social information to guide their cooperative pulling actions as they learned to work together. Interestingly, our analysis of the DBN models also demonstrated distinct behavioral dynamics among the different pairs of marmosets, implying that each pair may have employed unique strategies to achieve cooperation. By using advanced tracking algorithms and analytical models, these findings collectively shed light on the complex nature of social interactions among non-human primates and emphasize the role of social gaze in facilitating successful cooperative behaviors.

thank you

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