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# Affect & Emotion

## Newsletter of the Swiss Center for Affective Sciences

## AFFECT, EMOTION AND MEMORY

### Research focus

How do emotion, stress and their regulation affect memory across the life span?
Prof. Ulrike Rimmele

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SWISS CENTER FOR
AFFECTIVE SCIENCES

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DE GENÈVE

# Editorial

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The year 2022 was rich in science and full of beautiful exchanges with the public!

In a nutshell, during 2022 CISA enjoyed:

- 95 publications,
- the 9th edition of our interdisciplinary summer school, ISSAS, this year devoted to emotion and well-being,
- two prestigious HUG innovation awards,
- a dynamic doctoral school with 43 members,
- the inauguration of the MAGNETOM Prisma FitT 3T MRI Scanner at the Brain and Behavior Laboratory, which will allow us to develop and propose even more advanced research projects,
- about twenty events for the general public in partnership with museums and festivals,
- the recording of a series of original podcasts (“Tout contre la Terre: le podcast” et “Tout contre la Terre: grands entretiens») on the decisive role of emotions in the climate crisis,
- the hosting of the international event Emotions Brain Forum in Geneva, and
- several art-science projects pursued with several artists in residence at the Swiss Center for Affective Sciences.

You will find more information on all these activities and others on our website at https://www.unige.ch/cisa, which we strongly encourage you to consult regularly.

The year 2022 has also marked the arrival of a new professor at the Swiss Center for Affective Sciences, Prof. Julia Langkau and her team, to whom we extend our warmest welcome.

This issue of the Newsletter features prominently the BBL and the work of Prof. Ulrike Rimmele, who presents in the section Research Focus her Emotion and Memory Laboratory and her research on emotional memory.

We wish you all a wonderful end of the year 2022, full of beautiful moments and emotional warmth.

We look forward to continuing with you in 2023!

The CISA Management Team

## How do emotion, stress and their regulation affect memory across the life span?

Prof. Ulrike Rimmele

Can you remember receiving your high school diploma? Your first kiss? Very likely, you are able to mentally travel back in time and remember these emotional events and the context in which you experienced them. Emotions have a profound impact on what episodes of our lives we retain in memory. However, little is known about how the brain codes these episodic memories. Episodic memory comprises the capacity to make and retrieve memories that include information about an event (e.g. person, object) as well as information about the context in which the event occurred (date, place). For example: I had pizza for lunch with a colleague in a restaurant yesterday. Essentially the hallmark of episodic memory is that these separate elements and their spatiotemporal context are bound together into an integrated memory representation of the episode. However, how would an emotional item, e.g., you discover a wasp in your drink, change what you remember of this event? Would that work similarly or differently depending on your age? What impact does your emotional reaction have on the formation of your memory for this event? Does it matter if you feel stressed about the wasp or stay cool? And finally, how can you change your emotional memories once they are established?

The Emotion and Memory Laboratory headed by Professor Ulrike Rimmele addresses these questions. Funded with an Eccellenza Professorial Fellowship we developed these lines of research: Firstly, we aim to identify how emotion and stress affect the formation of episodic memories for emotional events vs. neutral events in humans. Secondly, we aim to gain a deeper understanding of these memory processes by including an assessment of emotional memory across the life span. Thirdly, we aim to define when and how behavioural strategies, such as emotion regulation, will weaken or strengthen memories for emotional events. In addition, a fourth line of research seeks to advance our understanding of how memory for an emotional event can be strengthened or weakened after its reactivation.

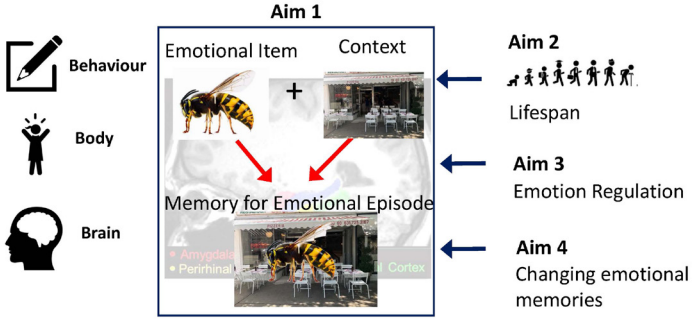
To identify how emotion modulates the construction of an emotional memory representation (Aim 1), in collaboration with Prof. Patrik Vuilleumier, post-doc Monika Riegel is using the novel technique of immersive virtual reality (VR) in combination with pharmacology, physiological and neuro-imaging measures. Crucially, VR enables to take the complex spatiotemporal nature of episodic memories into account. So far, we found that emotion enhances memory of temporal order and memory segmentation into events, but impairs element-context binding.

To characterize how emotion and stress modulate cognition and memory processes across the life (Aim 2), PhD student Neslihan Onay developed a new behavioral paradigm, which shows that emotion breaks associations within memory in adults. She is currently testing whether emotion similarly affects memory in children. In addition, in collaboration with Dr. Camille Piguet, we look at fear learning in adolescents. On the other side of the life scale, post-doc Pierrick Laulan aims to develop research projects to characterize subjective affective experiences and emotional memory in older adults. In particular, he is interested in determining how subjective affective experience evolves during aging may be influenced by both stimuli (e.g., visual complexity) and individual characteristics. In addition, in collaboration with Prof. Matthias Kliegel, Prof. Andreas Ihle and PhD student Greta Mikneviciute at the Center for the Interdisciplinary Study of Gerontology and Vulnerability (CIGEV), and Prof. Nicola Ballhausen (Tilburg University), we examine stress reactivity and stress influences on different types of cognitive functions in older vs. young participants.

For Aim 3, in collaboration with Prof. Andrea Samson (University of Fribourg), we compared the effects of two emotion regulation strategies on memory: re-appraisal and distraction. Importantly, both re-appraisal (i.e. thinking differently about an emotional stimulus) and distraction lower negative feelings. Yet, they have opposite effects on memory: re-appraisal enhances memory, while distraction lowers memory. Furthermore, in collaboration with Prof. Katherine Mickley Steinmetz (Wofford College, SC, US), we are currently examining how training of emotion regulation strategies affects memory for emotional events.

And finally, for Aim 4, PhD student Mai Elbassiouny will test the efficacy of visuospatial tasks during memory reconsolidation as a possible intervention for analog trauma. This basic science study will be in collaboration with PhD student Déborah Fort and Prof. Antje Horsch, from the University of Lausanne, who will run a clinical study on memory reconsolidation in parallel.

Our research will 1) contribute to building a comprehensive model of how emotional memories are constructed in humans across the life span, thus bridging hitherto separate research fields of affective and cognitive neuroscience with life span psychology; and 2) develop a better understanding of the regulation processes modulating emotional memories. The anticipated results will foster our understanding of emotion and stress effects on memories and their regulation, which will have strong potential to push the frontiers of knowledge for the field of education (e.g., fostering learning), healthy ageing and mental health. We also hope that the findings of this research will eventually translate from lab-to-clinic and improve patient outcomes ■



# BRAIN AND BEHAVIOUR LABORATORY (BBL)

## New upgraded MRI (Magnetom Prisma FitT 3T) at BBL

On Wednesday, June 1st 2022, the annual BBL-CIBM-FCBG research day was held. On this occasion, the BBL publicly announced the update of its MRI. With this update, the MRI has been given an almost total relifting, its components, gradients, antennas, and body have been refurbished by Siemens, giving the machine access to the latest sequences and new research possibilities.

## Visual Lab

The BBL now has a specialized data acquisition room for visual experiments. The former Sleep Lab 2 has been transformed into the Visual Lab. It is equipped with two new experiment computers, a perimetry device for evaluating the field of vision and an « EyeLink 1000 Plus » eye-tracker. In this room, visual measurements can be coupled with the olfactometer, EEG via the BIOSEMI system, and physiological measurements.

## BBL rooms enhancements

The control room of the current BBL sleep lab has also been transformed to provide an optimized and more comfortable working space.

The Parallel Testing Room, which had the EyeLink 1000 Plus, is now mainly dedicated to simultaneous behavioral acquisitions on multiple subjects (up to 12 subjects simultaneously). It is perfectly adapted for courses or seminars thanks to its new video projector.

The EEG room was equipped with new, more powerful computers to perform EEG neurofeedback experiments.

Finally, the behavioral room was redesigned to create a face-to-face space with participants in order to conduct neuropsychological tests.

## Completed PhDs

Sebastian Baez successfully defended his PhD thesis "Brain mechanisms underlying socio-emotional reactivity and recovery in older adults" on June 7, 2022, under the direction of Prof. Patrik Vuilleumier (University of Geneva).

Jonas Blatter successfully defended his PhD thesis "Unfair Emotions – On their morality and blameworthiness" on February 22, 2022, under the direction of Prof. Andreas Müller (University of Bern).

Patricia Cernadas successfully defended her PhD thesis "Investigating how emotions, and emotion regulation interventions change conflict-related social interactions" on March 18, 2022, under the direction of Prof. David Sander (University of Geneva), Prof. Eran Halperin (Hebrew University of Jerusalem) & Dr. Olga Maria Klimecki-Lenz (University of Geneva).

Liudmila Gamaiunova successfully defended her PhD thesis "Contemplative practices rooted in Buddhism and stress: Psycho-physiological perspective" on May 6, 2022, under the direction of Prof. Pierre-Yves Brandt (University of Geneva) & Prof. Matthias Kliegel (University of Geneva).

Florence Mazeres successfully defended her PhD thesis "Atteindre l'excellence sans gaspiller des ressources : Une interaction complexe entre le motif d'accomplissement et la difficulté de la tâche" on August 31, 2022, under the direction of Prof. Guido H.E. Gendolla (University of Geneva) and Dr. Kerstin Brinkmann (University of Geneva).

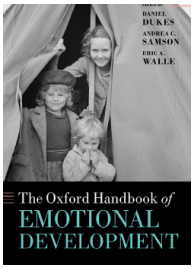
Mario Herberz successfully defended his PhD thesis "Behavioral sustainable mobility: Insights into the cognitive and motivational drivers of individuals' preferences" on September 30, 2022, under the direction of Prof. Tobias Brosch (University of Geneva) and Prof. Ulf Hahnel (University of Geneva).

Michele Ombrato successfully defended his PhD thesis "Emotion, Agency and Time" on March 25, 2022, under the direction of Prof. Julien Deonna (University of Geneva).

Maude Ouellette-Dubé successfully defended her PhD thesis "Ordinary ethical navigation: An account of moral understanding" on June 7, 2022, under the direction of Prof. Jean-Glaude Wolf (University of Fribourg).

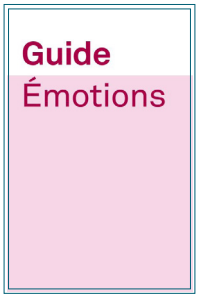
Marine Thomasson successfully defended her PhD Thesis "Spécialisation et intégration fonctionnelle du cervelet dans la reconnaissance des expressions vocales émotionnelles" on December 9, 2022, under the direction of Prof. Julie Péron (University of Geneva) and Prof. Didier Granjean (University of Geneva).

## New books / Special Issues




The Oxford handbook of emotional development.

Dukes, D., Samson, A., & Walle, E. (Eds.). Oxford University Press.




Guide Emotions

Samson, A., & Gabriel, A. (2022). Helsana Booklet.

## ISSAS 2022

After some delay due to the health crisis, on July 7-15 we finally held the 9th edition of ISSAS, our successful interdisciplinary summer school, this time devoted to the timely topic of emotions and well-being. The school, hosted at the beautiful Château de Bossey, overlooking lake Geneva, brought together 31 students, from 12 countries and 9 disciplines, as well as 21 internationally renowned researchers, for 8 days of intense exchange and networking around the role of affective experience in well-being. Students and faculty engaged in lectures, workshops, the design of interdisciplinary research projects, and a variety of social activities including a visit to the Montreux Jazz Festival. We thank the scientific and organizing teams, as well as all participants, for their input and energy, and congratulate them on the resounding success!

## Awards and grants

Brain Behaviour Laboratory (BBL, University of Geneva) (October 20, 2022) The two following BBL projects were awarded prizes at the HUG Innovation Day, in recognition of the work carried out by several members of the Swiss Center for Affective Sciences:

• PADAWAN project, HUG 2022 Innovation Award. PADAWAN offers a virtual classroom for children with attention deficit disorders. Authors : Carole Guedj (Laboratory for Behavioral Neurology and Imaging of Cognition, Department of Fundamental Neurosciences and Swiss Center for Affective Sciences, UNIGE), Rémi Tyrand (Swiss Center for Affective Sciences, UNIGE), Emmanuel Badier (Swiss Center for Affective Sciences, UNIGE), Russia Hà-Vinh Leuchter (Division of Development and Growth, Department of Paediatrics, Gynaecology and Obstetrics, HUG), and Frédéric Grouiller (Swiss Center for Affective Sciences and CIBM - Cognitive and Affective Neuroimaging Section, UNIGE).

• MRI Adventure application, Best Poster Award at HUG Innovation Day. The application MRI Adventure enables children to undergo an MRI examination without moving. Authors : Emmanuel Badier (Swiss Center for Affective Sciences, UNIGE), Laurent Moccozet (CUI, UNIGE), Amine Hadjiat (Faculty of Sciences, Computer Sciences Department, UNIGE), Bruno Bonet (Swiss Center for Affective Sciences, UNIGE), Christophe Mermoud (Swiss Center for Affective Sciences, UNIGE), Sylvain Delplanque (Swiss Center for Affective Sciences, UNIGE), Céline Gaignot (Medical Radiology, HEdS - Haute Ecole de Santé, Genève), and Frédéric Grouiller (Swiss Center for Affective Sciences, UNIGE).

Joffrey Fuhrer obtained a six-month SNSF grant to lead a project in Helsinki with Frank Martela for the project entitled “What is important about the meaning of life?”.

Didier Grandjean was granted a four-year (2022-2026) SNSF project entitled “How early neural entrainment induced by rhythmic emotional vocal and motor stimulation impacts on anticipatory processes and interpersonal synchrony in prematurely and term born infants”.

Ulrike Rimmele was granted an SNSF COST Action as Co-Investigator with Prof. Antje Horsch (CHUV) for the project entitled “Associating basic and clinical science to reduce childbirth-related traumatic flashbacks and posttraumatic stress”. She also obtained a one-year grant from the Olga Mayenfisch Foundation for the project entitled “Influence of the stress hormone cortisol on reconsolidation of emotional memories”.

Monika Riegel was granted a Marie Curie Global Fellowship for the project entitled “Neuromodulation of episodic memory - how stress and emotion influence Time In Memory”.

Philippe Voruz was awarded the Vasco Sanz fund prize for his paper on COVID-19 entitled “Functional connectivity underlying cognitive and psychiatric symptoms in post-COVID syndrome: Is anosognosia a key determinant?”.

## Upcoming events

Tout contre la terre, Natural History Museum Geneva

(October 14, 2021 to June 25, 2023). Dr. Cristina Soriano and Prof. Tobias Brosch participated in the realization of the temporary exhibition "Tout contre la Terre" at the Geneva Musèum. They invite us to explore our emotions and behaviors in the context of the environmental crisis. http://institutions.ville-geneve.ch/fr/mhn/votre-visite/agenda/tout-contre-la-terre/

Alpine Brain Imaging Meeting (ABIM) in Champéry (Switzerland)

(January 8 to 12, 2023). The conference will feature 5 days of talks, with invited speakers who are experts in different aspects of MRI and EEG in cognitive and clinical neuroscience, as well as free talks and poster presentations by other participants. Information and registration on https://www.unige.ch/ABIM/

KinderUni (KidsUni), University Campus, UniDistance Suisse, Brig, Switzerland

(May 3, 2023). Prof Andrea Samson organizes a public event entitled «Mit Brettspielen die Welt der Gefühle kennenlernen». Families are invited to learn about the world of emotions with board games. https://unidistance.ch/evenement/mit-brettspielen-die-welt-der-gefuehle-kennenlernen

International Red Cross and Red Crescent Museum

(May 7 and June 4, 2023). As part of the Museum's new thematic cycle on mental health, the Swiss Center for Affective Sciences researchers will offer guided tours of the permanent exhibition and workshops. They will share their scientific perspective in dialogue with humanitarians and the public. For dates and information : https://www.redcrossmuseum.ch/

Douze Mille Vingt

(November 2023). Following her artistic residency in the laboratory of Prof. Didier Grandjean in 2020, Julie Semoroz creates this project which refers to the internal perception of sound and acts on the ability to feel the internal physiological activity as indicators of emotions, of the body state. *Douze Mille Vingt* has since been shown in more than a dozen events and museums. It will be presented to the public again in November 2023 in a version that will have evolved in the exhibition room of the University of Geneva.

## On our website https://www.unige.ch/cisa/

Research materials are available at https://www.unige.ch/cisa/research/materials-and-online-research/research-material/. Free of charge for non commercial research projects.

Online Platform on Emotional Competence at https://www.unige.ch/cisa/research/materials-and-online-research/online-research/, including the major contributions and debates in the literature on emotional intelligence, potential applications, as well as results of the most recent research.

FACSGen is available to the scientific community. A demo is available for download, along with an introductory video tutorial on www.unige.ch/cisa/facsgen

## Other CISA websites of interest

XPhi Replicability: https://sites.google.com/site/thexphireplicabilityproject/ The XPhi Replicability project, coordinate by Prof. Florian Cova, seeks to reach a reliable estimate of the replicability of empirical results in experimental philosophy.

# News

## Publications

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