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International Association for the Study of Affective Touch

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Speaker Abstracts

Ellen Lumpkin

Columbia University

Associate Professor of Somatosensory Biology, Departments of Physiology & Cellular Biophysics and of Dermatology, Columbia University, USA

Co-director, Thompson Family Foundation Initiative in CIPN & Sensory Neuroscience, Columbia University Medical Center , USA

Ellen A. Lumpkin (Columbia University) is a sensory neurobiologist whose research has yielded insights into fundamental mechanisms of fine touch discrimination. She performed her PhD training in sensory neuroscience at UT Southwestern Medical Center and The Rockefeller University under the mentorship of A. James Hudspeth, a pioneer in the field of auditory and vestibular physiology. She completed postdoctoral research in physiology and biophysics at University of Washington, where she turned her attention to the cellular and physiological basis of touch sensation. Prior to joining the faculty of Columbia University in 2010, she launched her independent research program at UC San Francisco Medical Center through the Sandler Fellows Program, and was an Assistant Professor of Neuroscience, Physiology & Molecular Biophysics, and Molecular & Human Genetics at Baylor College of Medicine.

Illuminating the Molecular & Cellular Mechanisms of Touch

A rich variety of mechanosensitive cells trigger distinct skin sensations such as pressure, flutter and pain. Recent progress in the field has revealed key molecules and cell types that mediate fine touch discrimination. A growing body of research indicates that epithelial cells play a key role in sensation by activating or modulating peripheral neurons in healthy skin. Dr. Lumpkin's research aims to unveil how epithelial Merkel cells work in concert with the nervous system to generate different qualities of touch sensation. To tackle this question, her group uses neurophysiology, quantitative neuroanatomy, intersectional genetics, optogenetics, and mouse as well as non-traditional animal models. Recently, they demonstrated that Merkel cells have dual roles in mechanosensation: they transduce sustained pressure, and amplify information transfer during dynamic touch, which encodes shapes and textures. Current studies focus on defining molecular signaling mechanisms between epithelial cells and sensory neurons, unravelling conserved functions of touch receptors across species and tissues, and elucidating mechanisms that establish and maintain epithelial-neuronal connections in healthy skin.

Johan Wessberg

University of Gothenburg

Professor, Dept. of Physiology, University of Gothenburg, Sweden

Johan Wessberg is a Professor of Neurophysiology at the Sahlgrenska Academy, University of Gothenburg, Sweden. He has studied human hand motor control, proprioception and tactile mechanisms using microneurography, where single identified nerve fibres are recorded or stimulated in human participants. He also has a strong interest in applying modern mathematical techniques such as Machine Learning in the field of neurophysiology. Current projects include CT afferents, combining microneurography and functional brain imaging, prosthetic touch, and computer display technology that integrate visual and tactile information.

The 1st Order Neuron: CT Afferents

The human hairy skin has a system of unmyelinated mechanoafferents with low mechanical thresholds, so called C-tactile or CT afferents. These are found in the hairy skin, and respond readily to light touch. They are tuned to slowly moving stimuli, for example a moving brush, and respond optimally when the touching object has the same temperature as the skin. We demonstrated that psychophysical ratings of pleasantness were correlated with the mean discharge frequency in CT afferents, but not with firing in the four classes of myelinated (A) afferents in the human hairy skin. We propose that the CT system is important for signalling emotional, pleasant touch to the skin, rather than having a discriminative function. CT afferents appear to be tuned to the characteristics of typical human skin-to-skin contact, such as caresses.

Vincenzo Donadio

University of Bologna

IRCCS Istituto Scienze Neurologiche di Bologna, UOC Clinica Neurologica, Ospedale Bellaria, Italy

Vincenzo Donadio is a Neurologist, and associate medical director (Day Hospital supervisor).He has several papers published in peer-reviewed international jounals. He has been a reviewer for the National Research Council (Ministry of Education and Research) of Romania since 2011, and is a referee for several international journals, including: New England J Medicine, Brain, Acta Neuropathologica, Journal Physiology. He has been invited to present nationally and internationally on the use of microneurography and skin biopsy to study small nerve fiber involvement in neurological diseases.

The Molecular Biology of Touch Neurones

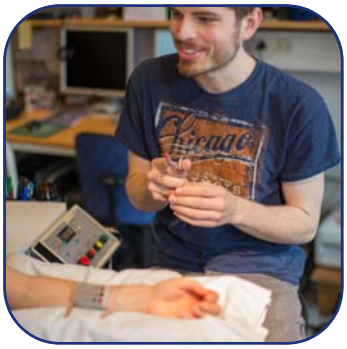
The talk will deal with the molecular neurobiology of affective touch. Affective touch is hypothesised to be driven by unmyelinated low-threshold mechanoreceptors that are often abbreviated as CLTMs in animals and CTs in humans. Despite numerous neurophysiological studies, morphological identification of CLTMs has been reported in only a few animal studies, but with contrasting data.

In the first mouse study, CLTMs were identified with a rare subpopulation of unmyelinated sensory fibers denominated Mas-related G protein–coupled receptor B4 (MrgprB4) which encircled the neck of hair follicles. By contrast, a different mouse study supported the correspondence of CLTMs with tyrosine hydroxylase (TH) positive fibers which were found to form longitudinal lanceolate endings associated with hair follicles. A morphological study of CTs skin endings in humans is needed to explain species-related difference or to define if CLTMs described in animals represents only one class of human CTs.

Roger Watkins

University of Gothenburg

Postdoctoral Researcher, Department of Neurophysiology, University of Gothenburg, Sweden



Roger Watkins obtained his PhD from the University of Bristol, UK in 2014, supervised by Professor Sally Lawson, using combined in vivo single cell electrophysiology and immunocytochemistry in C-fiber afferents to study pathological pain mechanisms in rats. In 2014 he was awarded an early career fellowship to work at the University of Gothenburg, Sweden under the supervision of Professor Johan Wessberg. Here, he trained in the technique of microneurography to study individual afferent fibers in human subjects.

Identification of C-Tactile & C-Nociceptive Afferents in Humans by Latency Slowing

Unmyelinated mechanoreceptive afferents (C-mechanoreceptors) are present in human skin and signal a spectrum of affective mechanical stimuli, from touch up to intense pain. C-mechanoreceptors can be putatively divided into populations signaling gentle touch (C-tactile afferents, CTs) and nociception (C-mechanosensitive nociceptors, CMs). Activation of CTs and CMs gives rise to positive and negative affect, respectively. Classification by repetitive electrical stimulation and latency slowing has proved to be an effective method for distinguishing C-nociceptor populations in both human and animal studies.

In the studies presented, electrical stimulation and latency slowing was applied to a population of C-mechanoreceptors to investigate how fundamental the divisions between putative subpopulations are. Microneurography was used to record from individual afferents in human subjects and both mechanical and electrical stimuli were applied to the skin to classify C-mechanoreceptors. Results from these studies show that using electrical stimulation and latency slowing, C-mechanoreceptors can be distinguished unequivocally into two putative populations, comprising CTs and CMs. There is markedly less latency slowing in CTs as compared to CMs. Electrical receptive field stimulation is more effective in classifying C-mechanoreceptors than mechanical stimulation alone, which can be ambiguous, and provides a more robust method of separating these two populations of afferents. Substantial differences are likely to exist in the mechanisms governing axonal conduction between CTs and CMs.

These studies have identified a distinctive 'signature' of CTs based on their responses to electrical stimulation, and this distinctive response profile suggests that CTs have unique axonal properties among C-fibers. This signature provides a simple method for identifying CTs and can be used to identify CTs in future single-unit and multiunit microneurography studies, and CT equivalents in translational animal research into affective touch. Additionally, differential mechanisms of axonal transmission in C-mechanoreceptor subpopulations may be pharmacologically targetable for separate modulation of positive and negative affective touch information. .

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Francisco Taberner

Heidelberg University

Postdoctoral Researcher, Pharmacology Institute, University Heidelberg, Germany

Postdoctoral Researcher, European Molecular Biology Laboratory, Rome, Italy

Francisco J Taberner received his PhD from the University of Valencia (Spain). He then worked at Universidad Miguel Hernandez (Spain) studying the regulation the cold and heat-sensing ion channels and its involvement in disease. Currently, he is a postdoctoral researcher in a joint project between University Heidelberg (Germany) and the European Molecular Biology Laboratory (EMBL-Rome, Italy) aimed to understand the role of C-LTMRs in pain. He is also involved in unravelling how Piezo2, the main force-sensing ion channel in touch, transduces mechanical forces into electrical currents.

Bringing Light to the Spinal Cord Circuitry

When someone caress us, or when get injured, sensory fibres, including different touch and pain receptors, simultaneously activate. The sensory information is then transmitted to the brain through different pathways where it is finally interpreted and triggers, when necessary, the appropriate behaviour. Our knowledge on how sensory information travels to the brain is solid. While most of touch information travels directly from the skin to different brain regions, signals from C-tactile, pain, itch and other fibres are processed in the spinal cord before they reach the brain. It is also well known that the spinal cord receives fibres from the brain and that in each spinal segment, all the fibres interact with interneurons forming intricate circuits which shape the information relayed to the brain. However, we don't even reach to understand a minimal fraction of this complex circuitry.

Classical anatomical studies in human and in other mammals have delineated the basic organization of the spinal cord. Electrophysiological recordings of spinal cord neurons have offered comprehensive insights in the interneurons types and properties. Nevertheless, the precise connections of sensory and brain fibres with interneurons is mostly uncovered by these techniques. Fortunately, the amenability of mice to genetic modification is allowing us to name players and draw the topology of spinal cord connections. Despite this, a precise understanding on how individual sensory fiber types influences the message forwarded to the brain and therefore how it contributes to animal behavior is still missing. This is especially true for tactile stimuli where even the finest caress simultaneously activates hundreds of mechanoreceptors including C-tactile and A□ low threshold mechanoreceptors. This makes it extremely hard to isolate the role of individual fiber type in a precise and controllable manner. In the present talk, in addition to depicting our current understanding of touch circuits in the spinal cord I will present you how we can gain key insights of individual fiber contribution by shining light on sensory afferents expressing a light activated ion channel.

Andrew Marshall

University of Manchester

Honorary Lecturer & PhD Student, Natural Sciences and Psychology, Liverpool John Moores University, UK

Consultant Clinical Neurophysiologist, Clinical Neurophysiology, Salford Royal NHS Foundation Trust, UK

Andrew is a senior clinician who has come to research at a (relatively) old age! He has a specialist clinical as well as academic interest in assessing patients who present with dysfunction of peripheral somatosensory nerves, particularly those with small fibre neuropathy and neuropathic pain. He is actively researching the somatosensory system, including C-tactile afferents, in health and pathology.

The 2nd Order Neuron

The spinothalamic tract (STT) forms the primary ascending projection system for thermoceptive and nociceptive A-delta and C-fibre afferents. On neuroanatomical grounds input from low threshold mechanosensitive C-Tactile (CT) afferents, which are hypothesised to encode the pleasant/affective nature of touch, also likely ascend via the STT. However, direct evidence is lacking. We assessed for alterations in affective touch in patients undergoing STT lesioning for unilateral cancer related pain.

STT lesioning resulted in contralateral thermal sensation deficits. Clinical pain and contralateral cowhage induced itch were abolished. Pleasantness ratings for CT optimal (3cm/s) and sub-optimal (0.3 and 30cm/s) stroking touch showed no significant difference before and after lesioning or between lesioned and non-lesioned sides. However a significant contralateral reduction in touch intensity ($p<0.005$) was observed following lesioning. Assessment of Sensory and emotional descriptors of touch revealed contralateral post-cordotomy deficits in 'negative' aspects of touch but little change in 'positive' aspects.

Unlike the dramatic changes in thermoception, nociception and itch the effects on affective touch are subtle. Although alterations in touch are seen on the contralateral side following STT lesioning although CT afferent input appears to be processed differently to that of other C-fibre afferent classes. The effects are most evident for perceived touch intensity and there is no evidence of a dedicated STT labelled line for the hedonic, velocity tuned, aspects of stroking touch. This may reflect spinal integration of mechanosensitive inputs or higher cortical processing of intact dorsal column cortical input.

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Francis McGlone, *School of Natural Sciences & Psychology, Liverpool John Moores University, & Institute of Psychology, Health & Society, University of Liverpool, UK*

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Laura Case

NCCIH

K99 Postdoctoral Fellow, National Center for Complementary and Integrative Health, NIH, USA

Laura Case is currently a postdoctoral fellow at the National Center for Complementary and Integrative Health, NIH with Dr. Catherine Bushnell. Her research uses fMRI, TMS, and pharmacological manipulation to probe brain regions involved in affective touch. Laura was recently awarded a K99/R00 Pathway to Independence grant to study whether deep pressure touch involves an affective pathway like that of C-LTMR touch. Laura received her PhD in Psychology and Cognitive Science from UC San Diego in 2013. Her doctoral dissertation, conducted with Dr. Vilayanur Ramachandran, focused on the multisensory construction of body perception and differences in individuals with atypical body perception.

Cortex and Affective Touch: The central representation of affective touch

Processing of pleasant touch stimuli involves a distributed cortical network including regions involved in discriminative touch, affective touch, and general hedonic response. Many studies have focused on C-LTMR touch as a model for understanding the relationship between affective touch input and brain response. Studies in healthy humans and in patients with AB-fiber neuronopathy have demonstrated processing of C-LTMR-optimal touch in the insula e.g.[1-3]. However, ratings of touch pleasantness have correlated with brain areas including the insula[4], orbitofrontal cortex [5], anterior cingulate cortex (ACC[6]), and primary somatosensory cortex (S1[5,7]). The apparent involvement of S1 is surprising given the general division between discriminative and affective touch in the brain. However, many studies do not account for differences in texture or intensity of affective touch stimuli. We conducted two studies to test the separation of affective and discriminative touch. Using TMS and MRI we demonstrate that S1 and S2 are causally involved in touch discrimination and intensity perception, but not touch pleasantness. Our data implicate the ACC in the perception of C-LTMR touch pleasantness. We have also begun to study the pleasantness of deep pressure touch, commonly utilized in massage therapy and linked to reductions in stress, depression, and pain. We designed a programmable sleeve to deliver massage-like limb compression that was rated similarly pleasant to C-LTMR-optimal touch. I will present preliminary data on brain representation of deep pressure. Finally, I will discuss evidence that touch pleasantness involves opioidergic mechanisms. Opioid receptors are especially concentrated in brain areas related to pain and affect[8], and there is evidence in nonhuman primates that they influence the desirability of social touch e.g.[9]. When we blocked endogenous opioid receptors with naloxone, we found increased touch pleasantness in healthy adults, suggesting that low levels of endogenous opioids may make affiliative touch more pleasant.

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9.00 *Keynote 2*

Frances Champagne

Columbia University

Professor, Department of Psychology, University of Texas at Austin, USA

Adjunct Associate Professor, Department of Psychology, Columbia University, USA

Frances A. Champagne is a Professor in the Department of Psychology at University of Texas, Austin and an Adjunct Associate Professor in the Department of Psychology at Columbia University. She received a M.Sc in Psychiatry and Ph.D in Neuroscience from McGill University. Dr. Champagne is a world leader within the evolving field of behavioral epigenetics – the study of how life experiences lead to behavioral and neurobiological variation through epigenetic factors. Though mechanistic studies in this field are addressed primarily in animal models, Dr. Champagne has also established collaborations to explore epigenetics within humans to determine the contribution of these molecular marks to neurobiological outcomes.

'LickStart' the Brain With Touch

Development is a dynamic process involving interplay between genes and the environment. This interplay can have both immediate and long-term effects that impact the brain and behavior. The tactile context of early postnatal development can trigger these dynamic pathways through epigenetic mechanisms. The quality of mother-infant tactile interactions can have lasting epigenetic effects on the brain with consequences for stress reactivity, social behavior and cognition and may also lead to multigenerational effects. These postnatal interactions can also serve to moderate the epigenetic impact of prenatal adversity. In this talk, the pathways through with tactile environments alter gene activity through epigenetic mechanisms will be explored and the current state of our knowledge of the ways in which these environments can be inherited will be highlighted.

Chris Murgatroyd

Manchester Metropolitan University

Senior Lecturer, School of Healthcare Science, Manchester Metropolitan University, UK

Chris Murgatroyd is a Reader at Manchester Metropolitan University. His research focuses on molecular mechanisms underlying early environmental programming. Working on mouse and rat models, and human cohorts, he studies the epigenetic mechanisms, by which early-life environmental exposures, such as stress, can programming of long-term gene regulatory changes.

Epigenetic Effects of Maternal Stroking on the Glucocorticoid Receptor Gene

In animal models, prenatal and postnatal stress is associated with elevated hypothalamic pituitary axis (HPA) reactivity mediated via altered glucocorticoid receptor (GR) gene expression. Postnatal tactile stimulation is associated with reduced HPA reactivity mediated via increased GR gene expression. In a large prospective study from pregnancy to age 5 years (Wirral Child Health and Development Study) we examined the joint effects of prenatal and postnatal environmental exposures and maternal stroking on methylation of the GR gene (NR3C1) 1-F promoter. We found interactive effects of prenatal and postnatal depression, specifically that methylation was elevated in the presence of increased maternal postnatal depression following low prenatal depression. We further found that this effect was reversed by stroking of infants by their mothers over the first weeks of life.

Examining sex differences we found that postnatal depression associated with NR3C1 1-F promoter methylation, and with anxious-depressed symptoms, only in the daughters of mothers lacking the hypothesised protective effect of high prenatal depression. These findings support the role of epigenetic mechanisms linking early life stress with long-term effects, and highlight the importance of translational research in linking studies in animals to humans.

Additional Authors:

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A. Pickles, *Institute of Psychiatry, King's College London, London, UK*
J. Hill, *School of Psychology and Clinical Language Sciences, University of Reading, Reading, UK*

Martine Van Puyvelde

Vrije Universiteit Brussel

Postdoctoral Researcher, Department Life, Royal Military Academy, Belgium

Visiting Professor, Department of Clinical LifeSpan Psychology, Vrije Universiteit Brussel, Belgium

Martine Van Puyvelde works as a postdoc researcher at the Royal Military Academy and lectures at the Vrije Universiteit Brussel. Her research within the domain of parent-infant interaction is situated on the borderline between music-language within a context of human psychophysiology. She also started a new research collaboration with Prof. Francis McGlone (Somatosensory & Affective Neuroscience Group, Liverpool) on the impact of maternal affective touch on mother-baby cardiorespiratory processes. Within the domain of human performance, she is currently in the lead of a project on hypobaric hypoxia in pilots and is studying social deprivation and different types of performance in extreme conditions. Besides being a researcher, she is a family therapist and professional musician.

"Touch-stars": the physiological impact of maternal touch

According to the social touch hypothesis (McGlone, Vallbo, Olausson, Loken, & Wessberg, 2007), C-tactile (CT) afferents, which innervate the human skin, play a crucial role in the experience of affective touch. In this study, we examined the impact of maternal affective touch on the physiological cardiorespiratory processes in both the mother and the infant to increase our insight into the developmental processes of affective touch preferences. Mothers and infants were video-recorded during an experimental touch/no-touch design. Their ECG and respiration were registered and analysed second by second. The physiological reactivity of both mothers and infants were processed and interpreted in relation with touch preferences of the mothers based on the video recordings and TEAQ questionnaires.

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Francesco Cerritelli

University of Chieti-Pescara

PhD(c), Department of Neuroscience Imaging and Clinical Sciences, "G. D'Annunzio" University of Chieti-Pescara, Italy

Director, Foundation C.O.ME. Collaboration, Italy

Francesco Cerritelli is an osteopath DO with broad interests in osteopathic and touch research, neuroscience and health science focusing on interdisciplinary aspects of evidence based medicine. Francesco has published several scientific papers in this field. In 2008 he founded the European Institute for Evidence Based Osteopathic Medicine (EBOM), a non-profit research association then transformed into a not-for-profit foundation named C.O.ME. Collaboration in 2014. Between 2009 and 2014 Francesco was appointed head of research at A.I.O.T. and was assigned to teach neuroscience in the same institution. In 2011 Francesco attended the Master in Public Health at Imperial College London and in 2014 started a PhD program focusing on fMRI and the interoceptive aspect of osteopathy. Francesco has also received several international prizes in relation to the scientific activities conducted.

Touch in a multidisciplinary NICU environment: "Pre-term" pleasure, physiological regulations and "long-term" insights in neonates.

International Health Agencies such as the WHO have determined that improving the quality of pre-terms' life is a key priority to be achieved by 2035. Annually 15 million premature babies worldwide - particularly those under 32 weeks of gestation - are at high risk of developing neurocognitive impairments with consequent adverse health effects (cognitive disabilities, developmental delays, illnesses), which apart for their prematurity may also occur due to the lack of care for babies with disabilities or developmental delays after hospital discharge. On the long term, health improvements in premature newborns have been linked to an integration of typical care with complementary approaches based on touch, including osteopathy. Interestingly, there is growing evidence that manual therapies, specifically osteopathy, are clinically effective in perinatal care, but the underlying biological basis of its therapeutic effects remain largely unknown. Given that the sense of touch plays a critical role in osteopathy, the presentation explores the potential mechanisms by which stimulation of the skin senses can exert beneficial physiological and psychological effects, aiding growth and development. The lecture will discuss how a class of low threshold mechanosensitive c-fibre (c-tactile afferents), which respond optimally to gentle, slow moving touch are likely to play a direct and significant role in the efficacy of manual therapies. A greater understanding of the impact the type and quality of touch plays in therapeutic tactile interventions and in particular the neuroscience underpinning these effects will aid the development of more targeted, population specific interventions.

Kevin Pelphrey

George Washington University

Professor, The George Washington University, Washington D.C., USA

Children's National Health System, Washington D.C., USA

Kevin Pelphrey is Carbonell Family Professor and Director of the Autism and Neurodevelopmental Disorders Institute at The George Washington University (GW) and Children's National Health System (CNHS) in Washington, DC. As a neuroscientist, his research investigates the brain basis of autism and related neurodevelopmental disorders. Dr. Pelphrey is the Director of the National Institutes of Health (NIH) Autism Center for Excellence—Multimodal Developmental Neurogenetics of Females with Autism Network that spans GW/CNHS (the lead site), Yale, Boston Children's Hospital, UCLA, UCSF, University of Southern California, and Seattle Children's Hospital. His contributions to the field have been recognized by receipt of a NIH Scientist Career Development Award from the National Institutes of Health, a John Merck Scholars Award, and the American Psychological Association's Boyd McCandless Award for distinguished early career theoretical contributions to Developmental Psychology. Dr. Pelphrey is the inaugural Director of the Autism and Neurodevelopmental Disorders Institute. The Institute serves as a focal point for translational research and comprehensive clinical services for autism spectrum disorders. Based in Washington, DC the Institute is a beacon for policymakers, media and the public seeking information on issues surrounding policy, research and treatment of autism spectrum disorders.

"See me, feel me, touch me..." Autistic Disruption of Brain Systems for the Perception of Social Intentions

I will first present our recent research aimed first at delineating the neural systems that allow typically developing people to effortlessly read another person's intentions through multimodal social cues that are perceived through sight, sound, and/or touch. I will then illustrate the ways in which these systems develop atypically in some (but not all) individuals with autism spectrum disorder(s). Finally, I will discuss how we are utilizing this basic and translational knowledge to develop biologically-based tools for detection, stratification, and individually tailored treatments.

Rebeccah Slater

University of Oxford

Associate Professor of Paediatric Neuroimaging, University Of Oxford, UK

Rebeccah Slater is a Wellcome Trust Fellow, Associate Professor of Paediatric Neuroimaging at the University of Oxford and a Fellow of Green Templeton College. Dr Slater studied Physics (BSc) at Imperial College and Neuroscience (MSc) at UCL and was awarded a PhD in 2007, where she made the first observations that noxious-evoked brain activity could be recorded in the newborn infant brain.

Dr Slater now leads The Paediatric and Infant Pain & Anaesthesia (PiPA) group, which is focused on understanding the development of human pain. She is interested in the critical newborn period when infants are first exposed to tissue injury and begin to process and experience pain. Her group uses a range of non-invasive brain imaging tools, including EEG and fMRI, to explore the development and treatment of pain in the human nervous system.

She has published numerous research articles about infant pain in journals such as The Lancet, Current Biology, eLife, and PLOS Medicine. Her work has generated considerable public interest and she has been passionately involved in science communication and the public engagement of science. She has taken part in numerous scientific discussions on TV and radio, including BBC Radio 4, The BBC World Service and Horizon.

Dr Slater continues her research at the John Radcliffe Children's Hospital and the Oxford Centre for Functional MRI of the Brain (FMRIB) to improve our understanding of the measurement and treatment of infant pain.

The Impact of Gentle Touch on Infant Pain Perception

The provision of adequate pain treatment in hospitalised infants is challenging as care providers are reliant on non-direct measures to quantify an infant's pain experience. Electrophysiological measures of noxious-evoked brain activity can be recorded in the infant and used to establish whether pain interventions reduce the transmission of nociceptive information to the infant brain. In infants both massage and gentle stroking are reported to provide pain relief, with numerous studies suggesting that these interventions reduce pain-related changes in behaviour and physiology. We have developed an experimental set-up in the newborn term infant to test whether gentle brushing, applied at a speed that preferentially activates C-tactile (CT) afferents, reduces the noxious-evoked brain activity and reflex withdrawal activity generated by both experimental and clinically-essential noxious stimulation. In this talk I will describe preliminary data that suggests that activation of CT afferents in the infant reduces noxious-evoked brain activity.

Ilona Croy

TU Dresden

Department of Psychosomatic Medicine, University Hospital Dresden, Technische Universität Dresden, Germany

Ilona Croy studied psychology and completed her training in psychodynamic psychotherapy in Dresden, where she also did her doctoral degree. Afterwards, Ilona spent three years as a post-doc in Gothenburg and continued working as Associate Senior Lecturer in Linköping, Sweden. However, as Dresden is a wonderful place to live and work, she returned to the department of psychosomatic medicine where she now leads the research union. Her research focusses on neural biomarkers of psychological disorders and she is fascinated by the human brain as well as by large data sets.

Affective Touch Perception Across The Lifespan

C-tactile fibers moderate affective touch perception and mothers stroke their babies in a way that may stimulate those fibers in the child. We examined factors that relate to the stroking velocity mothers use to caress their babies and hypothesized an impact of maternal heart rate and bonding.
In a first study, 30 healthy mothers (aged 20 to 43 years) were asked to stroke their respective baby (aged 4 to 45 weeks) in a rest condition and after experimental manipulation of the maternal heart rate (sport condition). The maternal stroking was tracked using a novel method which involves video capturing and semi-automatic analysis of the video data.
Furthermore, the mothers answered questionnaires about mental health. In a second study, the maternal stroking behavior of mothers with mother-child bonding disorders was investigated. The results show that mothers stroked their baby in a periodic way with velocities that target C-tactile fibers. After experimental increase of the maternal heart rate, the mothers' stroking velocities increased significantly. Stroking velocities did not relate to any of the questionnaire data (study one). Preliminary results from mothers with mother-child bonding disorders will be presented as well.

Additional Authors:
Bytomski, A.
Bendas, J.
Ritschel, G.
Weidner, K.

13.40 *Keynote 3*

Kerstin Uvnäs-Moberg

Swedish University of Agricultural Sciences

Professor, Dept of Animal Environment and Health, Swedish University of Agriculture

Kerstin Uvnäs Moberg is a physician and professor of physiology with a research focus on the healing aspects of oxytocin. Her vision is to help creating healthier and happier women by expanding the knowledge about female physiology and by creating medical interventions based on oxytocin. Her discoveries have helped to stimulate the development of oxytocin to become a pharmaceutical drug, to be used to increase social competence in autistic individuals, to decrease anxiety, stress and depression and to increase wellbeing. She has written more than 450 scientific articles and several books on oxytocin, (which have been translated into 10 languages).

The Biological Role of Oxytocin in Social Behaviour

Effects of skin to skin contact immediately after birth
Skin-to-skin contact between mother and baby immediately after birth is linked to activation of adaptive behavioural, neuroendocrine and physiological effects in both mother and newborn. The newborn performs a complex breast-seeking behaviour and the maternal interaction with the baby is stimulated. Levels of anxiety decrease and pain threshold increases in both. The mothers may experience strong feelings of joy and happiness. Maternal oxytocin levels increase during this period of interaction. The babies fall asleep after about 90 minutes. Skin-to-skin contact is linked to several positive long-term effects including better social interaction between mother and infant and reduced reactions to stress in the infant one year later.

Sensory mechanisms mediating the effects of skin-to-skin contact
Visual, auditory and olfactory senses are involved in the effects caused by skin-to-skin in mothers and babies. The majority of effects are most certainly induced by activation of sensory nerves in response touch, stroking, pressure and temperature, by CT afferents in particular, but other types of sensory nerves may also be involved. Activation of CT
afferents most certainly give rise to wellbeing and also other effects via neurogenic pathways during skin-to-skin contact. But what about the behavioural, neuroendocrine and physiological effects caused by skin-to-skin contact? It is likely that some of the behavioural, neuroendocrine and physiological effects induced by of skin-to-skin contact are mediated by release of endogenous oxytocin in response to stimulation of Ct afferents.

Oxytocin
Administration of or release of endogenous oxytocin stimulates different kinds of social behaviours including maternal behaviour. It decreases levels of anxiety and pain, it induces wellbeing and calm, it decreases stress levels via a reduced activity in the HPA axis and the sympathetic nervous system and it stimulates digestive, anabolic and healing processes and growth e.g. by an enhanced parasympathetic nervous tone. The similarity between the effect pattern induced by administration of oxytocin and by skin- to-skin contact suggests that oxytocin might be involved in the effects caused by skin-to-skin contact.

Siri Leknes

University of Oslo

Associate professor, Dept. Psychology, University of Oslo, Norway

Siri Leknes is an affective neuroscientist trained in Oxford, Gothenburg and Oslo. The Leknes Affective Brain lab is dedicated to the study of one of the world's great mysteries: how the brain gives rise to subjective feelings. To this end, we employ psychopharmacology, brain imaging and experimental psychology methods.

The Neurochemical Basis Of Affective Touch Perception - a Review of Current Evidence

CT-optimal touch can be pleasant or unpleasant.
When pleasant, the affective response is thought to reinforce behaviours leading to further receipt of touch. One of the major determinants of the affective value of touch is: who is touching you?

Pleasant touch is thought to aid the formation and maintenance of close social bonds. Current theories highlight oxytocin and mu-opioids as the most central peptides for social bonding, and therefore likely candidates to underpin touch pleasantness, motivation for caress-like touch, and other effects of touch relevant to social bonding.

I will review current evidence from psychopharmacology and PET imaging in humans.

Surprisingly, there is virtually no evidence implicating mu-opioids in touch pleasantness perception, nor in motivation for touch. Results from a recent PET study were consistent with a decrease, not the expected increase, in endogenous opioid release during touch from a partner.
The evidence from intranasal oxytocin studies is mixed, but consistent with a selective effect such that only touch from a desirable or close individual is modulated.

In sum, when CT-optimal touch is pleasant and leads to motivation for further touch, a number of neurochemical systems are likely involved in the human brain and body. Oxytocin may play a role, consistent with its modulation of non-touch processes. However, the mu-opioid system does not appear to be critical for appreciation of or motivation for caress-like touch in humans.

Additional Authors:
Guro Løseth, *University of Oslo*

Paula Trotter

Manchester Metropolitan University

Lecturer, Department of Psychology, Manchester Metropolitan University, UK

Paula Trotter is currently lecturing in Psychology at Manchester Metropolitan University. After completing her undergraduate degree in Pharmacology and Physiology at the University of Manchester, Paula began her PhD researching neurobiological mechanisms of affective touch and their role in depression at The University of Manchester. Paula remained at The University of Manchester for her first post-doc, investigating the neurobiology of resilience to depression, then moved to Liverpool John Moores University, researching the role of serotonin in affective touch responses. Paula's research is focussed on the role of serotonin in the encoding of affective touch responses, with a view to understanding the importance of affective touch in the promotion of general well-being and prevention of psychiatric disorders, such as depression, for which deficient serotonin function is implicated.

CTs & the Blues: The Role of 5-HT on Social Touch & Depression

Depressive disorders are becoming extremely common, being the leading cause of disability worldwide. Social isolation is a known risk factor for the onset of a depressive episode and a major component of social isolation is a lack of affective touch. The brain chemical serotonin has long been implicated as the neurotransmitter involved in the aetiology of depression. This talk will examine the role of affective touch from a population, systems and molecular approach.

Early parental neglect and current social isolation are major vulnerability factors for the onset of depression after stressful life events. Lack of affective touch may contribute to the effects of psychosocial risk factors, with research finding that a lack of maternal affection, in terms of warmth, cuddling and kissing during childhood, to be a significant predictor of adult chronic depression in women. Although it is known that current social isolation and a lack of maternal affection during childhood are important factors for the onset and chronicity of depression, the neurobiological mechanisms are not known. Evidence will be provided that CT activating touch signals the presence of social support and attachment and that the central representation of pleasant touch requires the involvement of the mood altering neurotransmitter, serotonin.

15.30 *Springer Data Blitz Session*

Chair: Katerina Fotopolou

15.30 to 17.00 **5m Talk + 2m Q&A**	**Johanna Bendas** *TU Dresden*	C-tactile mediated erotic touch perception relates to sexual desire & performance in a gender-specific way
	Rebecca Böhme *Linköping University*	Is it you or is it me? Differentiating between self- & other-touch
	Connor Haggarty *Liverpool John Moores University*	Early and Late Neural Responses to Affective Touch
	Gijs Huisman *University of Twente*	Effects of stroking velocity & touch stimulus on perceived pleasantness in observed affective touch
	Louise Kirsch *University College London (UCL)*	Embodied Emotional Egocentricity Bias: A new approach to the distinction between self & other affective states
	Sarah McIntyre *Linköping University*	Pleasantness of tactile motion does not vary with speed when C-Tactile activation is held constant
	Elena Pangiotopoulou *University College London (UCL)*	Pleasure to See you in Me: Affective Touch Enhances Self-Face Recognition
	Ralph Pawling *Liverpool John Moores University*	The relationship between autonomic regulation and sensitivity to CT touch
	Laura Pirazzoli *University College London (UCL)*	How does affective touch modulate arousal states? An investigation in early development
	Federica Riva *University of Vienna*	Age-related changes in the neural correlates of empathy for pleasant & unpleasant touch
	Juulia Suvilehto *Aalto University*	Cultural Universalism in Social Touch
	Marian von Mohr *University College London (UCL)*	Affective touch & attachment anxiety modulate pain in romantic couples: A laser-evoked potentials study

Please see the IASAT2017 Poster Abstract booklet for Data Blitz session abstracts

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Nina Jablonski

Pennsylvania State University

Evan Pugh University Professor of Anthropology, Department of Anthropology, The Pennsylvania State University, USA

Nina G. Jablonski is Evan Pugh University Professor of Anthropology at The Pennsylvania State University. A biological anthropologist and palaeoanthropologist, Jablonski pursues basic research on the evolution of adaptations of primates, including humans, to their environment. Her research on the evolution of human skin and skin pigmentation has been the focus of numerous papers and two popular books, Skin: A Natural History (2006) and Living Color: The Biological and Social Meaning of Skin Color (2012), both published by University of California Press. Jablonski received her A.B. in Biology at Bryn Mawr College in 1975 and her Ph.D. in Anthropology at the University of Washington in 1981. She is an elected Fellow of the American Academy of Arts and Sciences, the American Philosophical Society, and the American Association for the Advancement of Science.

Social Touch in Primates

Most primates live in stable, closely knit social groups. Communication between individuals is by vision, sounds, smell, and touch, with social touch playing a major role in the establishment and maintenance of social bonds. Affiliative touch in primates begins with a long period of mother-infant bonding and extends to other group members throughout juvenile and adult life. Social touch promotes individual well-being and group cohesion, and is essential for the prevention and mitigation of aggression between individuals. Social touch has played a central role in the evolutionary success of primates as a lineage, and -- long before the emergence of articulate speech and language -- served a key role in human evolution. Far from being a useless relic of humanity's evolutionary past, social touch is still critical to human health and well-being.

India Morrison

Linköping University

Senior lecturer, Center for Social and Affective Neuroscience, Linköping University, Sweden

India Morrison uses fMRI and other measures to investigate the neural bases of affective touch, as well as related systems contributing to pain. Her primary research interest is in discovering how the underlying neural processes of touch and pain relate to behavior, especially social behavior. Her educational background spans philosophy and cognitive neuroscience. She is currently a principal investigator and co-director of the Group for Research in Affective Somatosensation and Pain (GRASP) within the Center for Social and Affective Neuroscience (CSAN) at Linköping University, Sweden.

Is Affective Touch Even A Thing?

The study of affective touch neuroanatomy is still in its beginning stages, but several main themes have begun to emerge. First, that affective touch is anatomically and functionally distinct from discriminative touch; second, that it is an essentially social phenomenon; and third, that affective touch plays a role in alleviating or buffering stress, via certain candidate neural systems. To varying degrees, these propositions assume that an underlying neuroanatomical system for affective touch is unified and distinct. Further, there is often a tacit assumption that the system's very existence must reflect the evolutionary importance of touch in social interactions. This talk summarizes these themes and probes these implicit assumptions. It draws on comparative anatomy to present a perspective in which affective touch, as we humans experience it, may arise from multiple, interacting neural systems with distinguishable functional roles and evolutionary histories.

Susannah Walker

Liverpool John Moores University

Senior Lecturer, School of Natural Sciences & Psychology, Liverpool John Moores University, UK

Susannah Walker is a Senior Lecturer and member of the Research Centre for Brain and Behaviour at Liverpool John Moores University. Her research is focused on how exposure to biologically salient sensory stimuli, primarily in somatosensory and olfactory domains, influences emotional and cognitive behaviour. After completing her PhD in Behavioural Neuroscience at the University of St Andrews in 2002, she spent 6 years as a Research Associate in the Department of Experimental Psychology at the University of Cambridge where she studied the neural and neurochemical basis of executive control behaviours mediated by the prefrontal cortex. Subsequently, she spent 3 years working as a research scientist for Unilever R&D; here her role involved managing and developing external collaborations with academics in cognitive psychology and neuroscience, as well as leading internal research in human olfaction. She returned to academia, to take up her current position, in November 2011.

A positive touch: C-tactile afferent targeted skin stimulation carries a positive affective value

The rewarding sensation of touch in affiliative interactions is hypothesised to be underpinned by a specialised system of unmyelinated nerve fibres, C-tactile afferents (CTs), which respond optimally to slowly moving, gentle touch, typical of a caress. However, with methodologies used to study these skin afferents in humans primarily confined to basic neuroscientific and psychophysical quantification of response properties, there is still limited direct empirical evidence to support the theory that CTs encode socially relevant and rewarding tactile information. Recent data from our laboratory, combining physiological and behavioural measures, indicates tactile stimulation that optimally activates CTs caries a positive affective value that can be measured implicitly and, through acquired associations, can be transferred to previously neutral socially relevant stimuli. In addition, we report that, even when viewing rather than receiving touch, humans have a specific preference for CT optimal caressing, with ratings reflecting established velocity tuning and hypothesised anatomical distribution of CTs. However individual differences exist, with sensitivity varying as a function of psychological and physiological traits. Ultimately, we present the case that the CT system provides a neurobiological basis for the formation and maintenance of social bonds and attachment relationships and as such are a potential target for therapeutic tactile interventions.

Additional Authors:

Ralph Pawling, *Research Centre for Brain & Behaviour, School of Natural Sciences & Psychology, Liverpool John Moores University, Liverpool, United Kingdom*

Paula Trotter, *Department of Psychology, Manchester Metropolitan University, Manchester, UK*

Francis McGlone, *School of Natural Sciences & Psychology, Liverpool John Moores University, & Institute of Psychology, Health & Society, University of Liverpool, UK*

Katerina Fotopoulou

University College London

Reader, CEHP, University College London, USA

Aikaterini (Katerina) Fotopoulou, PhD, is a Reader in Psychodynamic Neuroscience at the Psychology and Language Sciences Division, University College London. Funded by a Starting Investigator Grant from the European Research Council for the project 'Bodily Self', she runs KatLab, a group of researchers and students that conduct studies on topics and disorders that lie at the borders between neurology and psychology. See here for projects and publications: http://www.fotopoulou.com. Katerina is one of the founders of IASAT.

Objectified by Vision, but Socialised by Touch: The C Tactile System in Multisensory Integration

In this talk, I will defend the claim that our selfhood is first and foremost embodied and social, i.e. build upon the foundations of multisensory integration that is fundamentally shaped by embodied interactions with other people in early infancy and beyond. Such embodied interactions allow the developing organism to 'mentalize' its homeostatic regulation. In other words, embodied interactions contribute directly to the building of predictive mental models (inferences) of the infant's sensory and physiological states, given the need to maintain such states within a given dynamic range despite internal or external perturbations. To support this claim I will present empirical studies on social, affective touch, and particularly a specialized modality characterized by peripheral and central neurophysiological specificity, namely the CT afferent system. CT-optimal touch has a unique role in shaping our perception of our own body as ours and as under our volitional control. Specifically, I will present (1) recent, accumulating evidence in healthy volunteers (5 experiments, N = 190) pointing to the crucial role of synchronous, affective touch in multisensory integration, body ownership and body agency, (2) recent experimental and neuroimaging findings in stroke pointing to the role of certain brain areas for the tactile as opposed to the visual contributions to body representation and (3) a series of experiments on multisensory integration and affective touch in Anorexia Nervosa. Collectively, these studies show that synchronous social touch has the potential to 'sculpt' the progressive integration and organisation of sensory and motor signals into coherent, predictive, mental models, a process which I have linked to contemporary, computational models of brain function and named 'embodied mentalization'. Crucially, given the dependency of humans in early infancy, there is a 'homeostatically-necessary' plethora of such touch-based interactions, so that interoceptive inferences and emotions necessarily rely on other people's actions (active interoceptive inference).

Uta Sailer

University of Oslo

Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Norway

Uta holds a MSc in Psychology and a PhD from the Dept. of Neurology, Ludwig-Maximilians-University Munich. Following a postdoc on the topic of eye-hand coordination in Umeå, Sweden, and in Vienna, Austria, on EEG correlates of reward and feedback processing, she worked as lecturer and then professor at the Dept. of Psychology, University of Gothenburg, Sweden. Since 2013 she is full professor at the University of Oslo, Faculty of Medicine.

CTs and Autonomic Nervous System Regulation

The autonomic nervous system (ANS) regulates basic vital functions in response to sensory monitoring of homeostasis. Touch activates the ANS, eliciting a sympathetic (activating) or parasympathetic (calming) response. At the same time, different states of ANS functioning presumably affect touch processing and/or perception and its effects. The talk gives an overview about CTs and their relationship to the ANS.

Stuart Wilson

University of Sheffield

Lecturer, Department of Psychology, University of Sheffield, UK

Stuart Wilson's research aims to understand how self-organisation and natural selection interact to shape complex systems, such as brains. To this end, he constructs mathematical and computational models of adaptive self-organising networks. His research has focussed on two model systems; i) self-organising neural network models of the development of topological maps in sensory and motor cortex, and ii) self-organising models of the evolution and development of collective behaviour in animal groups. His current research is focussed on the interplay between these two systems, exploring how self-organising interactions between developing animals shape, and are in turn shaped by, self-organising networks in developing brains. He is particularly interested in the interplay between brain and behaviour in the evolution of social and cognitive systems.

A Model of Social Thermoregulation

Social thermoregulation refers to the idea that attachment, in humans and other mammals, develops from processes that evolved originally for predicting the thermal consequences of making contact with others. An important model for social thermoregulation is the `huddling' behaviours displayed by litters of many rodent species, including laboratory mice and rats. For example, cross-fostering experiments designed to control for underlying differences in thermal physiology have revealed correlations between neonate huddling style and individual differences in adult sociality and emotionality.

In cold environments huddling allows littermates to exchange heat and to reduce their exposed surface areas, reducing the metabolic costs of maintaining a high body temperature. As animals grow, their thermal physiologies mature, defining in the adult a 'thermoneutral zone' of temperatures over which minimum metabolic costs are incurred. However, rats and mice continue to huddle together into adulthood, even at thermoneutral temperatures. Understanding the transition from 'physiological huddling' in neonates to this 'filial huddling' behaviour in the adult may help reveal the underlying mechanisms of social thermoregulation.

Patterns of aggregation in the huddle, the development of thermal physiology, and the neural representation of touch, have each been described in sufficient detail that theories of rodent social thermoregulation can start to be expressed formally and tested using computer simulations. In this talk I will present a simple (formal) model of social thermoregulation, based on a combination of thermodynamics and associative learning, which can explain both the emergence of physiological huddling in young animals, and the transition to filial huddling in adults. I will also report on preliminary progress at mapping the emergence of filial huddling behaviour onto the development of specific subcortical and cortical circuitry, and suggest how computational modelling of rodent huddling might lead to a formal theory of the neural basis of affective touch.

Henrik Norholt

Ergobaby Inc.

Chief Science Officer, Ergobaby Inc.

Dr. Henrik Norholt's primary research focus is the effects of extended parent-infant contact. He is engaged in developing research into novel parent-infant interventions through his international network of researchers and clinicians within psychology, pediatrics, orthopedics, obstetrics, breastfeeding medicine, health visiting and midwifery. Outcomes for the research include attachment and long-term parental and child physiological and psychological health. The research spans a wide range of scientific topics, including amongst others child and adult brain and hormonal adaptation, attachment theory, perinatal stress and resilience processes, child socio-emotional regulation and pediatric orthopedics.

A Father's Role in Attachment & Touch - Stimulating fathers' unique and important contributions to child development through touch.

Fathers' attachment processes during pregnancy and the immediate postpartum have received scant attention. We summarize current knowledge. Fathers' caregiving behavior is distinctly different to mothers' and has been found to contribute uniquely to child development. Fathers' attachment representations, brain and hormonal systems are influenced and shaped through being and interacting with their infant through father-infant contact and touch. Sensitive periods/windows of opportunity for fathers' tactile engagement with young infants are discussed with focus on clinical implications.

Luke Tanner

Freelance Body Psychotherapist and Dementia Care Trainer, UK

Luke is a Body Psychotherapist and freelance dementia care trainer and consultant. In collaboration with care providers, mental health professionals and massage therapists Luke has developed training programmes on Touch and Non-verbal Communication and shared his specialist approach with dementia care providers across the UK and Ireland.

In May 2017 Luke published "Embracing Touch in Dementia Care. A Person Centred Approach to Touch and Relationships". Outlining perspectives, training exercises and culture change actions to maximise the benefits of touch in dementia care settings, this book enables carers to reflect on their own use of touch and develop the knowledge, skills and confidence to place meaningful touch at the heart of dementia care.

The Role of Touch In Dementia Care

Approaches to touch in professional dementia care settings can either function to secure or break the bonds of trust and affection crucial to consensual caregiving; alleviate or escalate distress; erode or sustain personhood. Care Workers, however, are rarely invited to reflect on the role of touch in their work or consider its implications for the well-being of the people in their care. Furthermore, professional carers are often unsure about what kinds of touch are appropriate to "care work" and concerned about how others might perceive their touch. This doubt and uncertainty can confine touch to care tasks and procedures and prevent carers from being in touch with people with dementia in more meaningful ways.

The use of touch in dementia is also determined by factors ranging from prejudices about elderly people and people with dementia, staff uniforms, care home layout and furniture, infection control, to routine bound systems of care. Unless directly addressed, these issues often add up to an extremely confused or touch-averse culture of care. Such cultures of care have profound implications for the quality of life of people living in dementia care settings.

In this short presentation, Luke Tanner discusses the social psychology of touch in dementia care, highlighting how experiences of touch can function in parallel with the neuropathology of dementia to contribute to the cognitive, behavioural and psychological symptoms of dementia. Drawing upon his experience as a dementia care therapist, trainer and consultant, Luke also considers how research on affective touch may contribute towards a more positive person centred culture of touch in dementia care.

13.20 *Keynote 5*

Anthony Jones

University of Manchester

Professor of Neurorheumatology, Division of Neuroscience & Experimental Psychology, University of Manchester, UK
Lead of Human Pain Research Group, Salford Royal NHS Foundation Trust, Salford, UK

Anthony Jones is professor of Neuro-rheumatology at Manchester University and leads the Human Pain Research Group. Whilst at the Hammersmith Hospital he pioneered the development of techniques to image neurochemical and metabolic brain responses to pain using Positron Emission Tomography. Over the last twenty years he has used a number of functional brain imaging techniques to understand the normal and abnormal mechanisms of pain perception. There is now the exciting prospect of using some of the insights gained in these studies to develop new approaches to pharmacological and cognitive interventions for chronic pain. His main current goals are to use the current understanding of pain perception to encourage more rational use of current therapies and to develop new therapies. As part of this process he has been putting a lot of energy in to public understanding of science activities including a recent North West tour of a show about pain called 'Pain, The Brain and a little bit of Magic'.

The C-Musketeers

The discovery of fibres that are relatively specific to pain and pleasurable or socially reassuring touch has contributed to these fields of neuroscience becoming relatively respectable. Both phenomena are linked anatomically and also by social and professional taboos. Pain and itch are clearly protective but in some types of chronic pain become less so. Affective touch, from some of the work highlighted in this conference, plays a crucial role in social and emotional development.

These aspects of normal human physiology and function have their own distinct functions and may share common interactions which have important implications for human well -being. One aspect of common physiology I will focus on is the natural opioid system which is activated by pain, exercise, pleasurable stimulation and sex. However, much of what we experience during these activities is a combination of what we expect and hard-wired information. I will summarise the evidence for chronic pain having its origins in poor or abusive nurturing. In adults we have identified abnormalities of the cortical processing of expectation which are correlated with the extent of tenderness in patients with chronic pain conditions. These cortical abnormalities are reduced by mindfulness-based cognitive therapy (CBT) in quite a similar fashion to placebo involving descending modulation by the frontal cortex. Unfortunately patients with chronic pain live in a generally negative hedonic world, including common difficulties with normal social touch and gaining pleasure from this. As with patients with autism this is highly variable and not well studied.

Affective touch is a key aspect of social reassurance and I will hypothesise that the absence of this or its replacement by verbal of physical violence in childhood and adolescence, combined with societal constraints limiting the use of affective touch or pressure (hugging) provides for a society that is ill equipped for preventing chronic pain or mental illness and sometimes ill equipped to heal these conditions.

Pain is still not a required field of knowledge for the training of health workers and massage is frowned upon by the caring and healing professions because of its uneasy relationship with sex. This is on a background of few drugs being shown to be effective for chronic pain. I will illustrate how smart use of neurotherapies may be used to normalise abnormal c-fibre sensations and possibly provide some powder for the c-fibre musketeers in their future adventures.

IASAT President

Håkan Olausson

Linköping University

Professor, Department of Clinical and Experimental Medicine (IKE) & Center for Social and Affective Neuroscience (CSAN), Linköping University, Sweden

Håkan Olausson, MD, is a Consultant in Clinical Neurophysiology at the Linköping University Hospital and Professor in Clinical Neuroscience at the University of Linköping, Sweden. He did his undergraduate and graduate studies at the University of Gothenburg, Sweden and his postdoc training at McGill University, Montreal, Canada.

IASAT President

Francis McGlone

Liverpool John Moores University

Professor of Neuroscience, Research Centre for Brain & Behaviour (RCBB) & School of Natural Sciences & Psychology, Liverpool John Moores University, UK

Visiting Professor, Institute of Psychology, Health & Society, University of Liverpool, UK

Francis McGlone was awarded a BSc (Hons) in Neurobiology from the University of Sussex, where he also received his PhD. After postdoctoral posts at Manchester University he took up the position of Senior Neuroscientist at the Pain Research Institute, Department of Medicine, at the University of Liverpool, investigating mechanisms of neuropathic pain.

He joined Unilever R&D in 1995 where he established a new science base - Cognitive Neuroscience - with the specific objective to understand and apply knowledge of the basic neurobiological and psychological processes underpinning sensation, and the central processes of perception, attention, emotion and action, engaged during grooming and feeding behaviours. He returned to academia in 2009 and is currently Professor in Neuroscience in the School of Natural Sciences & Psychology at Liverpool John Moores University, Visiting Professor at Liverpool University and President of the International Association for the Study of Affective Touch (IASAT).

His primary area of academic research is in characterising the role of afferent c-fibres in humans, investigating their role in pain, itch, and more concertedly the functional and affective properties of a novel class of c-fibres - C-tactile afferents – that code for the rewarding properties of intimate touch. Techniques used in this research include microneurography, psychophysical measurements, functional neuroimaging, behavioural measures, and psychopharmacological approaches to investigate the role of the brain transmitters such as serotonin in affiliative and social touch.


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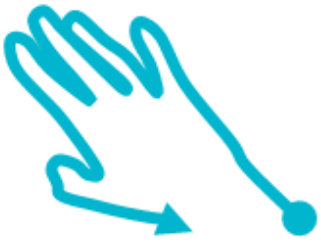

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