



## PROGRAM FRIDAY NOVEMBER 17

8:30 am: **Coffee and Registration**

9:15 am: **CONFERENCE OPENING**

9:30 am – 12:00 noon: **INVERTEBRATES, EARLY VERTEBRATES, AND THE EVOLUTION OF CONSCIOUSNESS**

Chair: David Chalmers (NYU, Center for Mind, Brain and Consciousness)

**Peter Godfrey-Smith** (Sydney, Philosophy)  
Animal Evolution and Subjective Experience

**Todd Feinberg** (Mt. Sinai, Neurology)  
The Ancient Evolutionary Origins of Consciousness

**Andrew Barron** (Macquarie University, Department of Biological Sciences)  
Insects have The Capacity for Basic Awareness

**Eva Jablonka** (Tel Aviv, Cohn Institute)  
Consciousness As We Know It: The Role of Learning

12:00 noon – 1:30 pm: **Lunch**

1:30 pm – 3:30 pm: **DO FISH FEEL PAIN?**

Chair: Ned Block (NYU, Center for Mind, Brain and Consciousness)

**Victoria Braithwaite** (Penn State, Biology)  
Does a Fish Feel its Pain?

**Stuart Derbyshire** (National University of Singapore, Psychology)  
Against Fish Pain

**Colin Allen** (University of Pittsburgh, Philosophy)  
On the Possible Realizers of Pain in Fish

3:30 pm – 4:00 pm: **Coffee**

4:00 pm – 6:00 pm: **ANIMAL ETHICS AND ANIMAL CONSCIOUSNESS**

Chair: Matthew Liao (NYU, Bioethics)

**Peter Singer** (Princeton, Philosophy)  
The Importance of Consciousness for Animal Ethics

**Marian Dawkins** (Oxford, Zoology)  
Animal Welfare With and Without Consciousness

**Lori Gruen** (Wesleyan, Philosophy)  
Some Cautions about Comparisons

## PROGRAM SATURDAY NOVEMBER 18

9:30 am: **Coffee**

10:00 am – 12:00 noon: **ANIMAL CONSCIOUSNESS AND THEORIES OF CONSCIOUSNESS**

Chair: Heather Berlin (Mt. Sinai, Psychiatry)

**Peter Carruthers** (University of Maryland, Philosophy)  
How to Make the Problem of Animal Consciousness Disappear

**Björn Merker** (Neuroscience)  
Animal Consciousness in Theoretical Context

**Michael Tye** (UT Austin, Philosophy)  
Is There an On/Off Switch for Consciousness in Animal Brains?

12:00 noon – 1:30 pm: **Lunch**

1:30 pm – 3:30 pm: **EMOTION AND SELF-CONSCIOUSNESS IN ANIMALS**

Chair: Dale Jamieson (NYU, Environmental Studies / Animal Studies)

**Diana Reiss** (Hunter College, Psychology)  
Reflections of Self-Consciousness in Other Animals

**Brian Hare** (Duke University, Evolutionary Anthropology)  
Am I Unintentionally Studying Animal Consciousness?

**Joseph LeDoux** (NYU, Neural Science)  
Emotional Consciousness in Animals: The Case of Fearful Feelings

3:30 pm – 4:00 pm: **Coffee**

4:00 pm – 6:00 pm: **PANEL DISCUSSION**

Chair: David Chalmers (NYU, Center for Mind, Brain and Consciousness)

**Daniel Dennett** (Tufts, Philosophy)  
**David Edelman** (San Diego, Neuroscience)  
**Stevan Harnad** (Montréal, Cognitive Science)  
**Alexandra Horowitz** (Barnard, Psychology)  
**Jennifer Jacquet** (NYU, Environmental Studies / Animal Studies)

6:00 pm: **Conference Close**

## ABSTRACTS

### FIRST SESSION: INVERTEBRATES, EARLY VERTEBRATES, AND THE EVOLUTION OF CONSCIOUSNESS

Peter Godfrey-Smith (Sydney, Philosophy)

#### **Animal Evolution and Subjective Experience**

I'll give an overview of animal evolution, focusing on the evolution of behavioral and neural complexity in various branches of the phylogenetic tree. I'll then try to say what this means for the origin and distribution of subjective experience (or consciousness, in a broad sense of that term), with special attention to invertebrates.

Todd Feinberg (Mt. Sinai, Neurology)

#### **The Ancient Evolutionary Origins of Consciousness**

In this talk I am primarily interested in explaining when and how vertebrates evolved the most basic forms of subjective sensory experience, what philosopher Thomas Nagel (1974) called "something it is like to be." This form of basic experience has various names including sensory consciousness, phenomenal consciousness, primary consciousness, and perceptual consciousness. Our view (Feinberg and Mallatt, 2016) is that this form of consciousness evolved with the creation of sensory images and affects and arose approximately 560-520 million years ago in not just vertebrates but in arthropods, then in mollusks (cephalopods) somewhat later. We propose that there was an extremely long road to the creation of consciousness and subjectivity that began over 3.7 billion years ago with the evolution of life and the development of the general biological features that are not sufficient for consciousness but are the biological foundations upon which animal consciousness is built. Then, after passing through a long transitional period, around 580 million years ago non-conscious neural reflexes evolved that served as the "gateway" and foundation to all forms of sensory consciousness. Then about 560-520 million years ago a "revolution" occurred in the creation of diverse forms of consciousness when a suite of special neurobiological features evolved that made consciousness and subjectivity possible. We propose it was here that the so-called "explanatory gaps" (Levine, 1983) and subjectivity naturally evolved as well and present a timeline and model of the natural evolution of animal consciousness.

Andrew Barron (Macquarie University, Department of Biological Sciences)

#### **Insects Have The Capacity for Basic Awareness**

Here I propose an argument from comparative neurobiology for how insects autonomously make decisions and organize their behaviour. The insect brain is an integrated system that generates a unified and egocentric neural model of the state of the mobile insect in space relative to salient objects. This model enables decision making, by providing a system within which to resolve the location of needed resource and the priorities of resource needs without recourse to a separate control system or regressing to a "Cartesian Theatre". From this perspective a functional analogy can be drawn between the insect brain and the systems of the vertebrate midbrain and diencephalon. I argue that insects operate as cognitive-affective agents, that they are experiential, and discuss whether it is reasonable to suppose a subjective character to their experience.

Eva Jablonka (Tel Aviv, Cohn Institute)

#### **Consciousness As We Know It: The Role of Learning**

I present an evolutionary framework for the study of minimal biological consciousness that is inspired by the study of the transition from inanimate matter to life. According to this approach, consciousness, like life, is a teleologically-intrinsic mode of being, which should be understood as a dynamic system of interacting biological processes. I identify an overt behavioural trait of the system — unlimited associative learning (UAL) — as the evolutionary transition marker for consciousness. This evolutionary marker corresponds to an evolved capacity that enables the functional reconstruction of the system that supports it, a system that instantiates the set of properties that are considered individually necessary and jointly sufficient for minimal consciousness. This approach leads to experimental predictions, has implications for the taxonomic distribution of consciousness in the animal world, and dissolves the problem of attributing a special "function" for consciousness.

## SECOND SESSION: DO FISH FEEL PAIN?

Victoria Braithwaite (Penn State, Biology)

### **Does a fish feel its pain?**

That fish detect noxious stimulation and respond to such damage through a nociceptive system is generally accepted. Whether a noxious stimulus results in a felt pain is more controversial. Fish respond to damaging stimuli in ways that go beyond nociception, but does this tell us anything about what the fish is aware of? Using empirical approaches that have investigated pain in fish, I will discuss what these do, or don't reveal about felt pain. I will then consider what kinds of evidence might be helpful for making inferences about whether a fish has any capacity for consciousness.

Stuart Derbyshire (National University of Singapore, Psychology / Clinical Imaging Research Center)

### **Against Fish Pain**

The argument that fish feel pain rests on a number of observations of fish anatomy and behaviour. Fish have been demonstrated to have nerve endings (nociceptors) that preferentially respond to noxious stimuli and whose fibres terminate in areas of the fish brain that regulate fish behaviour. Fish modify their behaviour after noxious insult – they withdraw from eating, rock, rub the area of damage and display less fear of novel objects (reduced neophobia) – and those behavioural changes are reduced with morphine. Nevertheless, the brains of fish are radically different from those of humans. Equating pain experience across fish and humans meets intuitive resistance because the radical differences in brain structure seem to demand a radical difference in experience. That might be resolved by arguing for a “central core” to pain experience that is shared by humans and fish, but is only elaborated into a self-conscious experience in humans. Fish might apprehend but not comprehend. Except that if fish do not comprehend sensation then they cannot experience pain.

Colin Allen (University of Pittsburgh, Philosophy)

### **On the Possible Realizers of Pain in Fish**

The debate among proponents and skeptics about pain in fish circles around the absence of cortical structures known to be involved in mammalian pain. Proponents argue that non-cortical structures may serve similar functions in fish to those served by cortical structures in mammals. Skeptics argue that whatever those other structures do, labeling it “fish pain” serves to obscure significant differences. I will frame this debate in terms familiar to philosophers as an instance of the “multiple realization” debate, and I will argue that given current understanding one should adopt a wait-and-see attitude — a position that will surely fail to satisfy both proponents and skeptics.

## THIRD SESSION: ANIMAL ETHICS AND ANIMAL CONSCIOUSNESS

Peter Singer (Princeton, Philosophy)

### **The Importance of Consciousness for Animal Ethics**

The ethics of how we treat animals is important because many animals are conscious beings. That is true whether we hold (as Sidgwick did and I do) that nothing has value independently of its effects on conscious states, or (as Moore once claimed) that the existence of beautiful objects is good even in the absence of conscious beings. On either view, what we do to conscious beings matters in ways that are distinct from, and more significant than, the ways in which we can harm or damage anything that is not and never will be conscious. Determining which animals are conscious beings, and what their conscious experiences are like, are therefore immensely important, though difficult, problems for animal ethics.

Marian Dawkins (Oxford, Zoology)

## **Animal Welfare With and Without Consciousness**

Faced with 'the hard problem' of consciousness, people concerned with animal welfare tend to adopt one of four positions on consciousness in non-human animals:

- 1) There is no problem. We just know that animals have conscious experiences
- 2) There is a problem but we have solved it
- 3) There is a problem and we haven't solved it yet but we soon will
- 4) There is a problem but it doesn't matter because we can have a science of animal welfare without consciousness.

There are advantages in defining animal welfare to include consciousness (positions 1-3 above) but also practical, scientific and ethical reasons for defining it without (position 4).

Lori Gruen (Wesleyan, Philosophy)

## **Some Cautions about Comparisons**

Much of the work that seeks to determine whether other animals are conscious (and have other cognitive experiences) depends on comparative methods that have the potential to mischaracterize or overlook unique experiences. This has significant implications for how we understand other animals and, importantly, how we should interact with them. Though I don't want to reject these methods outright, I will raise what I take to be serious worries.

## **FOURTH SESSION: ANIMAL CONSCIOUSNESS AND THEORIES OF CONSCIOUSNESS**

Peter Carruthers (University of Maryland, Philosophy)

### **How to Make the Problem of Animal Consciousness Disappear**

I assume (i) a global broadcasting account of the conscious/unconscious distinction and (ii) reductive representationalism about phenomenal consciousness. Given these assumptions, we should not expect there to be a specific point or points in phylogeny at which consciousness first emerges. Rather, there will be degrees of similarity, along a variety of different dimensions, between the architectures of animal minds and the global broadcasting architecture present in humans. I argue that any attempt to determine degrees of consciousness across phyla will be stipulative rather than substantive. The only interesting and substantive question concerns the details of cognitive organization in each species.

Björn Merker (Neuroscience)

### **Animal Consciousness in Theoretical Context**

Answers to questions regarding animal consciousness depend, even more so than those about human consciousness, on the kind of assumptions about the nature, origin, and function of consciousness that we bring to our inquiry. In the human case we possess at least a modicum of first-hand evidence on the topic, something denied us in principle for the animal case, making the latter precariously dependent on theoretical commitments and assumptions. No set of such assumptions makes a bigger difference in this regard than those underwriting a commitment to a physicalist account of consciousness versus those implying that no such account is likely to succeed. A pivotal argument for the latter position was made in a 1974 essay by Thomas Nagel, all the more relevant to our present topic in that it uses animal consciousness, specifically that of a bat, as a central stratagem of its argument. I will revisit that argument, dissect it critically, and trace the consequences for questions of animal consciousness of some of the conceptual developments it has helped inspire.

Michael Tye (UT Austin, Philosophy)

## **Is There an On/Off Switch for Consciousness in Animal Brains?**

Some have likened consciousness to an on/off switch or a light bulb. This talk is on the question of whether such a model is appropriate, where the supposed switch or light bulb might be located, and how we are to decide on the range of animals that are equipped with it.

## **FIFTH SESSION: EMOTION AND SELF-CONSCIOUSNESS IN ANIMALS**

Diana Reiss (Hunter College, Psychology)

### **Reflections of Self-Consciousness in Other Animals**

Given we lack a comprehensive checklist of constituent indices of self-consciousness/self-awareness in our own species, how do we proceed in searching for evidence of this phenomena in other animals? This phenomenon is not an all or nothing capacity and specific aspects of self-awareness have been empirically tested and demonstrated in other animals. In our lab we have used research paradigms that document how dolphins and elephants solve problems and interact with mirrors and more complex interactive systems (interactive keyboards and touchscreens) in the absence of explicit instruction. Dolphins showed the emergence of self-organized learning in their interactions with an underwater keyboard system as evidenced by vocal learning and the spontaneous productive use of learned associations. Both dolphins and elephants showed self-organized learning in their testing of the contingencies of mirror use prior to demonstrating mirror-self recognition. Although the mental processes involved in unfolding of mirror self-recognition remain elusive, the MSR paradigm affords us the ability to literally gain reflections of their percepts of self.

Brian Hare (Duke University, Evolutionary Anthropology)

### **Am I Unintentionally Studying Animal Consciousness?**

Can we know what it is to be human without first understanding what it is to be not human? In at least some contexts animals mentally represent their own experience as well as the perceptions, intentions and beliefs of others. They use these mental representations to make inferences to solve novel problems in adaptive ways. I will share recent experimental work that supports this rich interpretation of animal mental life, but also hints at where our species might differ from others and how unique forms of cognition evolve across species. To do this I highlight the main findings of a range of experiments with bonobos, chimpanzees and dogs examining their cooperative, competitive and communicative strategies. The goal of this brief review will be to provide a crash course on comparative cognition to aid attendees as we discuss the evolution of consciousness.

Joseph LeDoux (NYU, Neural Science)

### **Emotional Consciousness in Animals: The Case of Fearful Feelings**

Since Darwin, it has been commonly assumed that we humans have inherited emotions like fear from our mammalian ancestors. Similarities across species of behavioral responses elicited by threats is traditionally cited as evidence. This view is bolstered by the the conserved nature of the neural circuits that control threat-elicited behavioral responses across species. What would it mean if, in humans, the circuit that controls so-called fear behaviors is not responsible for fear itself?