Experiencing What's Not There

A Workshop on Hallucinations, Dreams, Imagination, and Virtual Reality

June 7 and 8, 2019
University of Toronto

Sensory experience of what's not there provides a foundational set of problems for philosophical theorizing about perception. This includes hallucinations, dreams, imagination, and virtual reality. Traditionally, these cases are thought to reveal something about (1) how experience of distal objects arises from proximal receptor stimulation and (2) the nature of the perceptual contact afforded through that experience.

This workshop brings together some of the best current research on experience of what's not there, from both philosophers and scientists. Although different in some ways, hallucinations, dreams, imagination, and virtual reality — all being experience of what's not there — overlap and intersect in interesting and important ways. By bringing together a diverse group of top researchers we hope to foster new and unconventional insights into these problem areas.

Location:

Jackman Humanities Building, Room 418
University of Toronto, St. George Campus
170 St George St
Toronto, ON M5R 2M8

Sponsors:

Hosted by the
University of Toronto Department of Philosophy
and the **Network for Sensory Research**
with funding from the **Canada Research Chairs Program**

Organizers:

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Speakers:

Alex Byrne

Massachusetts Institute of Technology
Professor of Philosophy
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Thomas Crowther

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Heather Culbertson

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Advanced Telecommunications Research Institute International (ATR), Kyoto, Japan
Senior Researcher
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Amy Kind

Claremont McKenna College
Director of the Gould Center for Humanistic Studies
Russell K. Pitzer Professor of Philosophy
Department of Philosophy

Michelle Lui

University of Toronto
Postdoctoral Fellow at the Institute of Communication, Culture, Information & Technology

Speakers:

Fiona Macpherson

University of Glasgow
Director of the Centre for the Study of Perceptual Experience
Professor of Philosophy
Department of Philosophy

Rhonda McEwen

University of Toronto
Director of the Institute of Communication, Culture, Information & Technology
Canada Research Chair in Tactile Interfaces, Communication and Cognition
Associate Professor of New Media & Communication
Faculty of Information (iSchool)

Jennifer Windt

Monash University
Senior Research Fellow, Philosophy
School of Philosophical, Historical and International Studies

Schedule:

Friday, June 7:

9-9:30am: Welcome Reception

9:30-10:45am: **Fiona Macpherson**
"Does Virtual Reality Consist in Veridical, Illusory or Hallucinatory Experience?"

10:50-12:05pm: **Thomas Crowther**
"Dreams, Imagination and the First-Person Perspective"

12:05-1:15pm: Lunch

1:15-2:30pm: **Heather Culbertson**
"Fooling the Sense of Touch through Data and Illusions"

2:30-3:00pm: Coffee Break

3:00-4:15pm: **Amy Kind**
"Can Imagination Be Unconscious?"

4:20-5:20pm: Discussant Panel with Casey O'Callaghan, Alison Springle, and Michael Barkasi

Saturday, June 8:

9-9:30am: Welcome Reception

9:30-10:45am: **Alex Byrne**
"Hallucination and Its Objects"

10:50-12:05pm: **Rhonda McEwen and Michelle Lui**
"Perception & Learning in Virtual Reality"

12:05-1:15pm: Lunch

1:15-2:30pm: **Tomoyasu Horikawa**
"Neural Decoding of What's Not There from Human Brain Activity"

2:30-3:00pm: Coffee Break

3:00-4:15pm: **Jennifer Windt**
"Dreaming as Immersive Mental Simulation: Beyond the Imagination-Perception Dichotomy"

4:20-5:20pm: Discussant Panel with Casey O'Callaghan, Jacob Beck, and Michael Barkasi

Abstracts:

Alex Byrne:
"Hallucination and Its Objects"

When one visually hallucinates, the object of one's hallucination is not before one's eyes. On the standard view, that is because the object of hallucination does not exist, and so is not anywhere. The paper defends the view that the object of hallucination does exist, and is somewhere.

Thomas Crowther:
"Dreams, Imagination and the First-Person Perspective"

Some ordinary non-lucid dreams, appear to involve, in some way, the dreamer having a first-person perspective. Very roughly, some dreams appear to involve a point of view that is subjective and in which representations occur or obtain that have 'I' as part of their content. The primary question that this talk focuses on is whether this appearance is correct:

Does a dreamer (at least, a dreamer of the relevant kind of dreams) have a first-person perspective?

There are, potentially, many different kinds of notion of a 'first-person perspective'. In this talk, I will try to describe a notion of a first-person perspective that is associated with the point of view of waking consciousness—a notion of such a perspective that is somewhat richer than the ideas briefly suggested above—that provides the basis for a negative answer to this question. I will go on to make a suggestion as to how we should understand the relation of such dreams to the first-person perspective of wakeful consciousness. I will then try to explain why, even if the dreamer does not occupy such a first-person perspective, it can seem natural to take it that they do. This explanation will turn on a distinction between different varieties of first-person imagining.

Heather Culbertson:
"Fooling the Sense of Touch through Data and Illusions"

The haptic (touch) sensations felt when interacting with the physical world create a rich and varied impression of objects and their environment. However, humans

are spending significantly more time in the virtual world and are increasingly interacting with people and objects through a digital medium. This talk will focus on how we can fool our sense of touch to convince someone that they are touching a physical object in a virtual world by displaying artificial touch sensations. I will explore the use of haptic illusions and pseudohaptics, which can minimize the amount of haptic hardware needed by relying on limitations of our sense of touch and the interplay with our other senses. I will also discuss the use of data recorded from physical interactions for creating realistic virtual interactions.

Tomoyasu Horikawa:
"Neural Decoding of What's Not There from Human Brain Activity"

Dreaming is a subjective experience during sleep, often accompanied by visual contents, whose neural basis remains unknown. Brain decoding through neuroimaging analysis of functional magnetic resonance imaging (fMRI) signals has enabled the interpretation of mental contents represented in the brain activity patterns. The technique can thus be used to examine the neural representation of dreams by testing whether neural decoders can predict dream contents from brain activity patterns. In my talk, I will first introduce our study demonstrating decoding of visual dream contents from fMRI activity patterns during sleep (1). Our analysis showed that decoding models trained on stimulus-induced brain activity in visual cortical areas accurately predicted dream contents, suggesting shared neural representations between perception and dreaming. For further exploration into neural representations of our mental world, I will also introduce several advanced brain decoding techniques that utilize deep neural networks to make it possible to decode and visualize richer information on our mental contents (2-4).

[1] Horikawa, T., Tamaki, M., Miyawaki, Y. & Kamitani, Y. Neural Decoding of Visual Imagery During Sleep. *Science* (2013)
[2] Horikawa, T. & Kamitani, Y. Generic decoding of seen and imagined objects using hierarchical visual features. *Nat. Commun.* (2017)
[3] Horikawa, T. & Kamitani, Y. Hierarchical Neural Representation of Dreamed Objects Revealed by Brain Decoding with Deep Neural Network Features. *Front. Comput. Neurosci.* (2017)
[4] Shen, G., Horikawa, T., Majima, K. & Kamitani, Y. Deep image reconstruction

from human brain activity. *Plos Comput. Biol.* (2019)

Amy Kind:
"Can Imagination Be Unconscious?"

Our ordinary conception of imagination takes it to be essentially a conscious phenomenon and traditionally, that's how it had been treated in the philosophical literature. In fact, this claim had often been taken to be so obvious as not to need any argumentative support (see, e.g., White 1990, 145). But lately in the philosophical literature on imagination we see increasing support for the view that imagining need not occur consciously (e.g., Walton 1990, Goldman 2006, Church 2008, Nanay 2013, Van Leeuwen 2014, Spaulding 2016). In today's talk, I examine the case for unconscious imagination. I'll consider four different kinds of arguments (or hints of arguments) that we can find in the recent literature — arguments that proceed via consideration of cases, via considerations relating to our engagement with fiction, via considerations relating to action guidance, and via considerations arising from simulationism. To my mind, none of these arguments are successful. Thus, as I'll ultimately suggest, the case for postulating unconscious imagining has not yet been well motivated.

Fiona Macpherson:
"Does Virtual Reality Consist in Veridical, Illusory or Hallucinatory Experience?"

Does virtual reality (VR) involve: (i) illusory or hallucinatory experience of things that are not there, or (ii) veridical experience of computational objects? I show that contemporary thinking about this issue involves a false dichotomy according to which the answer is either (i) or (ii), but not both. I begin this paper by first articulating my own account of illusion and hallucination in part by presenting new cases of illusion and hallucination that have not heretofore been identified. These cases show that the traditional accounts of illusion and hallucination are incorrect. I go on to provide a taxonomy of all of the different kinds of illusion and hallucination that I identify. New instances of illusion and hallucination provide much needed, important data for testing theories of experience and perception—and illuminate the nature of virtual reality experience. I go on to discuss virtual reality experience of the sort that is produced by today, and show that we need to take account of the nature of the technology used to produce it when considering whether the experience is veridical or not. I conclude that VR experience is highly

complex, containing a variety of both veridical and non-veridical elements.

Rhonda McEwen and Michelle Lui:
"Perception & Learning in Virtual Reality"

In virtual reality (VR), students can perceive scientific objects at non-tactile scales, those too small, such as atoms and molecules, and those too large to see, such as galaxy clusters. Further, physiological measures including pupil dilation obtained through eye-trackers integrated into head-mounted displays, skin conductance, and heart rate afford researchers the ability to trace students' responses, actions, and interactions as they engage in embodied learning settings. In this project, we will explore the connections between multisensory systems and cognition in supporting a deeper conceptual understanding of molecular processes for students in microbiology.

Jennifer Windt:
"Dreaming as Immersive Mental Stimulation: Beyond the Imagination-Perception Dichotomy"

In the philosophy of dreaming, it is common to assume that dreams fall into one of two categories, which are thought to be mutually exclusive: either they are quasi-perceptual phenomena, which is typically taken to imply they are hallucinations, or they are imaginative experiences.

I propose that describing dreams as immersive mental simulations can help overcome this dichotomy, illuminating how dreams are both perception-like and deeply imaginative. Like standard perceptual experiences, dreams are here and now experiences of a virtual world centered on a virtual self. Like imagination, they are driven by spontaneous processes, marking a deep commonality with mental simulation in wakefulness, including mind wandering and daydreaming. The sources of dreaming are similarly broad, spanning short- and long term memories, ongoing concerns, and emotions as well as illusory own-body perception during sleep.

Dreaming occupies a unique position in our taxonomy of mental states, and doing justice to its uniqueness requires us to rethink and expand the conceptual toolkit commonly used for its description. Understanding the commonalities between dreaming, perceiving and imagining without collapsing dreams into either category can enrich our understanding of our mental lives and forge new

connections between philosophy and contemporary research on sleeping and dreaming, but also on virtual reality and mind wandering.