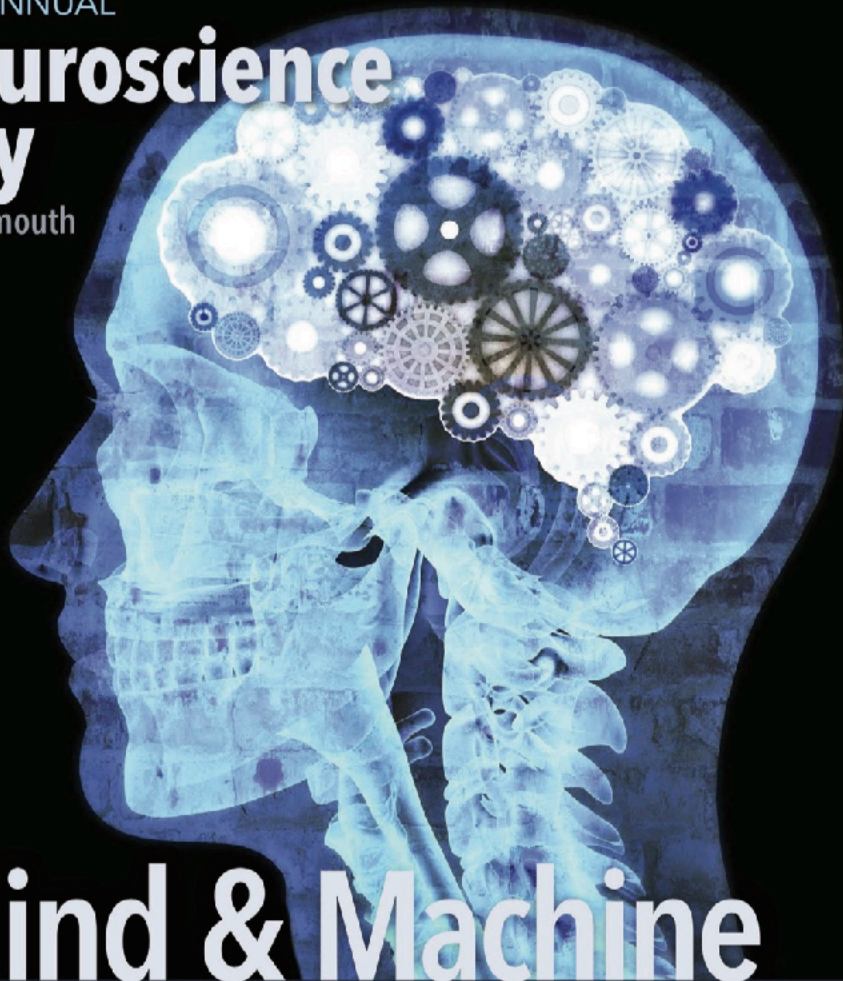


32ND ANNUAL

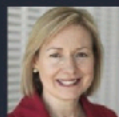
Neuroscience Day

at Dartmouth



Mind & Machine

KEYNOTE LECTURE



Dr. Rosalind Picard, ScD

Director of Affective Computing Research at MIT

April 14, 2018

8:30 am – 5:00 pm

Class of 1978
Life Sciences Center

CO-SPONSORS

The 32nd Annual Neuroscience Day at Dartmouth is co-sponsored by the following organizations:

Chroma Technology Corporation

Department of Biological Sciences

Department of Molecular & Systems Biology

Department of Neurology, DHMC

Department of Psychiatry, DHMC

Department of Psychological & Brain Sciences

The Institute for biomolecular targeting (bioMT)

The Neuroscience Center at Dartmouth

NH-INBRE

Thayer School of Engineering

Dartmouth



Dartmouth
GEISEL SCHOOL OF
MEDICINE



THAYER SCHOOL OF
ENGINEERING
AT DARTMOUTH



bioMT

Institute for Biomolecular Targeting

SCHEDULE OF EVENTS

8:30 AM - 8:55 AM - <i>Coffee and Poster Set-up</i>	LSC 200, Oopik Auditorium
8:55 AM - 9:00 AM - <i>Opening Remarks</i>	Oopik Auditorium
9:00 AM - 9:34 AM - <i>Poster Teaser Talks</i>	Oopik Auditorium
9:35 AM - 11:00 AM - <i>Poster Session</i>	LSC 200
11:00 AM - 12:00 PM - <i>Student Talks - Part 1</i>	Oopik Auditorium
12:00 PM - 1:00 PM - <i>Lunch</i>	Oopik Auditorium
1:00 PM - 2:00 PM - <i>Keynote Lecture</i>	
What can we learn about emotions, brain, and behavior from a wristband?	Oopik Auditorium
Dr. Rosalind Picard, ScD Director of Affective Computing Research, MIT	
2:00 PM - 2:45 PM - <i>Mind & Machine Panel Discussion</i>	Oopik Auditorium
2:45 PM - 3:00 PM - <i>Coffee Break</i>	
3:00 PM - 4:00 PM - <i>Faculty Talks</i>	Oopik Auditorium
4:00 PM - 5:00 PM - <i>Student Talks - Part 2</i>	Oopik Auditorium

KEYNOTE LECTURE

1:00 - 2:00 PM
Oopik Auditorium

What can we learn about emotions, brain, and behavior from a wristband?

Years ago, our team at MIT set out to give computers skills of emotional intelligence. We also built the first wearable technology to automatically recognize changes in human emotion. As we shrunk the sensors and made them wearable to collect data 24/7, we discovered several surprising findings, such as that “autonomic activity” measured through a sweat response was not as general as researchers thought, but carried more specific information related to different kinds of brain activity. This talk will highlight some of these surprising findings with implications for autism, anxiety, depression, sleep-memory consolidation, epilepsy, pain studies, and more.

About the Keynote:

Rosalind Picard, ScD, FIEEE, director of the Affective Computing Research Group at the Media Laboratory at M.I.T.



Rosalind Picard is the founder and director of the Affective Computing Research Group at the MIT Media Laboratory, co-founder of Affectiva, providing automated facial expression recognition, and co-founder and Chief Scientist of Empatica, improving lives with clinical quality wearable sensors and analytics. Picard is the author of over two hundred fifty peer-reviewed articles and of the book, *Affective Computing*, which helped launch that field. Picard’s lab at MIT develops technologies to better understand, predict, and regulate emotion, including machine-learning based analytics that work with wearables and smartphones, with applications including autism, epilepsy, PTSD, MS, depression, anxiety, sleep disorders, biofeedback, migraine and pain.

POSTER-TEASER TALKS

- 9:00 - 9:03 AM** **Stephen Meisenhelter, Neurology**
Attention and memory in human hippocampal electrocorticography
- 9:03 - 9:06 AM** **Yu Han, University of Vermont**
Brain-behavior connections in ASD: making sense of neural activity in emotion and ToX
- 9:06 - 9:09 AM** **Tanya Butt, Neurology**
Investigating the relationship between neurodegeneration and distance from a waterbody in autopsy
- 9:09 - 9:12 AM** **Laurie Delatour, MSB**
The effects of prenatal ethanol exposure on radial migration and the development of the somatosensory cortex
- 9:12 - 9:15 AM** **Faith Anderson, MSB**
Role of Bbc3 in programmed cell death in primary cortical neurons exposed to chlorpyrifos in vitro
- 9:15 - 9:18 AM** **Stephanie Lee, MSB**
Ethanol, calcium and growth cone dynamics in immature GABAergic cortical interneuron
- 9:18 - 9:21 AM** **Chenguang Li, MSB**
Coexpression of AMPA and NMDA receptors reduces variability in synaptic transmission
- 9:21 - 9:24 AM** **Katharine von Herrmann, MSB**
NLRP3 expression in mesencephalic neurons and polymorphism associated with risk of Parkinson's disease
- 9:24 - 9:27 AM** **Katie Edwards, MSB**
Evaluating the role of cohesin complex proteins in memory and learning
- 9:27 - 9:30 AM** **Juan Mercado del Valle, MSB**
Comparing the physiology of brain slices prepared in ice or at room temperature
- 9:30 - 9:33 AM** **Tomas Jordan, Thayer**
Non-invasive neural stimulation enabled by piezoelectric nanoparticles and ultrasound

POSTER SESSION

(9:35 AM - 11:00 AM)

1. Identifying aerosolized cyanobacteria as an environmental risk factor for ALS using human bronchoalveolar lavage and nasal swab specimens

D Facciponte¹, M Bough¹, J Rauh¹, J Carrol², D Seidler², J Dessaint¹, L Vaickus³, P Henegan¹, T Butt¹, A Andrew¹, and E Stommel¹

¹Dept. of Neurology, DHMC; ²Dept. of Pulmonary Medicine, DHMC;

³Dept. of Pathology, DHMC

2. Role of Bbc3 in programmed cell death in primary cortical neurons exposed to chlorpyrifos in vitro

FL Anderson, AL Young, KM von Herrmann, EM Martinez, HH Yeh, and MC Havrda

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

3. Attention and memory in human hippocampal electrocorticography

S Meisenhelter¹, ME Testorf², NR Hasulak³, TK Tcheng³, DS Rizzuto⁴, MJ Kahana⁴, and BC Jobst¹

¹Dept. of Neurology, DHMC; ²Thayer School of Engineering at Dartmouth College; ³NeuroPace, Inc.; ⁴University of Pennsylvania

4. The effects of prenatal ethanol exposure on radial migration and the development of pyramidal neurons in the somatosensory cortex

L Delatour, P Yeh, and HH Yeh

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

5. Brain-behavior connections in ASD: making sense of neural activity in emotion and ToM

Y Han and PA Prelock

Dept. of Communication Sciences & Disorders, University of Vermont

6. Comparing the physiology of brain slices prepared in ice or at room temperature

JC Mercado del Valle and AT Gullledge

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

7. Sex differences in corticostriatal local field potentials: Implications for alcohol drinking behavior

AM Henricks, LL Dwiell, EDK Sullivan, AI Green, and WT Doucette
Dept. of Psychiatry, DHMC

8. Ventrolateral periaqueductal gray signals threat probability on rapid or ramping timescales

KM Wright and MA McDannald
Dept. of Psychology, Behavioral Neuroscience, Boston College

9. An examination of the necessity of septo-hippocampal temporal coordination for self-localization in a spatial accuracy task

JM Barry
Dept. of Neurological Sciences, University of Vermont

10. Ethanol, calcium and growth cone dynamics in immature GABAergic cortical interneurons

SM Lee, FL Anderson, AGJ Skorput, PWL Yeh, HH Yeh
Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

11. Role of dorsolateral striatal cholinergic interneurons in behavioral response to changes in action-outcome contingencies

KA Amaya and KS Smith
Dept. of Psychological and Brain Sciences, Dartmouth College

12. Evidence of structure and persistence in motivational attraction to serial Pavlovian cues

EB Smedley and KS Smith
Dept. of Psychological and Brain Sciences, Dartmouth College

13. How aggressive should I be? Weaning medications in the epilepsy monitoring unit

Y Shahrour¹, A Hartshorn², A Andrew², and K Bujarski²
¹Thomas Health, South Charleston WV; ²Dept. of Neurology, DHMC

14. Investigating the relationship between neurodegeneration and distance from a waterbody in autopsy cases

TH Butt¹, DN Facciponte¹, PP Henegan², JW Corthers³, AS Andrew¹, and EW Stommel¹

¹Dept. of Neurology, DHMC; ²St. George University; ³University of Vermont Medical Center

15. Persistent coding of outcome-predictive cue features in the rat nucleus accumbens

JM Gmaz, JE Carmichael, and MAA van der Meer

Dept. of Psychological and Brain Sciences, Dartmouth College

16. Amygdala stimulation impairs emotion perception and emotional memory in human

K Bujarski, Y Song, B Jobst, M Testorf, and J Aronson

Dept. of Neurology, DHMC

17. Reciprocal control of corticofugal output by serotonin and acetylcholine

AL Baker and AT Gullledge

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

18. DLPFC transcriptome defines two molecular subtypes of schizophrenia

EFW Bowen¹, JL Burgess¹, R Granger¹, and CH Rhodes²

¹Dept. of Psychological and Brain Sciences, Dartmouth College; ²Henry M. Jackson Foundation for the Advancement of Military Medicine

19. Does a “salient stimulus” promote habit formation?

EA Thrailkill, N Murphy, and ME Bouton

Dept. of Psychological Science, University of Vermont

20. Evaluating the role of cohesin complex proteins in memory and learning

KA Edwards, BZ Kacsoh, and G Bosco

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

21. Loss of the autism-associated gene Pten alters the weights of excitatory presynaptic inputs

PD Skelton¹, PW Frazel², and BW Luikart¹

¹Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College; ²Sackler Institute of Graduate Biomedical Sciences, New York University

22. Behavioral effects of nicotine in a preclinical model of schizophrenia

EDK Sullivan¹, JY Khokhar², L Dwiell¹, and AI Green¹

¹Dept. of Neurology, DHMC; ²Biomedical Sciences, University of Guelph

23. Meningeal inflammatory aggregates in Theiler's virus model of multiple sclerosis

K. DiSano, D. Royce, F. Gilli, and A. Pachner

Dept. of Neurology, DHMC

24. Loss of neurofascin-186 disrupts ankyrin G localization within the axon initial segment and alters action potential initiation

SA Alpizar¹, AL Baker², AT Gullledge², and MB Hoppa¹

¹Dept. of Biological Sciences, Dartmouth College; ²Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

25. NLRP3 expression in mesencephalic neurons and an NLRP3 polymorphism associated with decreased risk of Parkinson's disease

KM von Herrmann¹, LA Salas², EM Martinez¹, AL Young¹, JM Howard¹, MS Feldman³, BC Christensen², SL Lee⁴, WF Hickey⁴, and MC Havrda¹

¹Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College; ²Dept. of Epidemiology, Geisel School of Medicine at Dartmouth College; ³Dept. of Neurology, Wright State University; ⁴Dept. of Neurology, DHMC

26. Distinct subsets of presynaptic K⁺ channels modulate frequency-dependent synaptic transmission in excitatory and inhibitory hippocampal neurons independent of net calcium influx

I Cho, S Alpizar, and M Hoppa

Dept. of Biological Sciences, Dartmouth College

27. Nlrp3 mediates distinct neuroinflammatory changes in chronic and acute toxin-based models of Parkinson's disease

E Martinez¹, AL Young¹, YR Pantankar², BL Berlin², K von Herrmann¹, WF Hickey³, JM Sullivan⁴, L Wang⁵, and MC Havrda¹

¹Dept. of Molecular and Systems Biology, Geisel School of Medicine;

²Dept. of Microbiology & Immunology, Geisel School of Medicine;

³Dept. of Pathology, DHMC; ⁴Medical College of Wisconsin

28. Stress narrative favors habit-based control of instrumental behavior in humans

S Mackey¹, O Pomazi², V Palermo², N Grubinger², K Walder¹, E Thrailkill³

¹Dept. of Psychiatry, DHMC; ²Neuroscience Program, University of Vermont;

³Dept. Psychological Sciences, University of Vermont

29. Coexpression of AMPA and NMDA receptors reduces variability in synaptic transmission

C Li and AT Gullledge

Dept. of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

30. Non-invasive neural stimulation enabled by piezoelectric nanoparticles and ultrasound

T Jordan¹, SA Alpizar², MB Hoppa², GP Luke¹

¹Thayer School of Engineering at Dartmouth College; ²Dept. of Biological Sciences, Dartmouth College

31. Implantation of permanent responsive neurostimulator concurrent with explant of intracranial monitoring electrodes: a study on infection risk in immediate versus delayed stimulator implant

E D'Agostino¹, D Scharzt¹, B Jobst², and JP Aronson³

¹Geisel School of Medicine at Dartmouth College; ²Dept. of Neurology, DHMC; ³Dept. of Surgery, DHMC

32. Sex-biased disability in a mouse model of progressive multiple sclerosis

D Royce, K DiSano, AR Pachner, and F Gilli

Dept. of Neurology, DHMC

33. Detecting and quantifying seizures using non-cerebral sensor modalities

A Hamlin¹, L Ray¹, E Kobylarz^{1,2}, JH Lever^{1,3}, and S Tylor^{3,4}

¹Thayer School of Engineering at Dartmouth College; ²Dept. of Neurology, DHMC; ³Cold Regions Research and Engineering Laboratory; ⁴Dept. of Earth Sciences, Dartmouth College

34. Analysis of epileptogenic spiking in ECoG recordings based on phase-space-inspired single representations

ME Tester^{1,2}, M Gorenstein³, S Meisenhelter³, and Barbara Jobst^{2,3}

¹Thayer School of Engineering at Dartmouth College; ²Dartmouth-Hitchcock Epilepsy Center; ³Dept. of Neurology, DHMC.

35. Beta amyloid peptide (A β 25-35) upregulates astrocyte proliferation in vitro

KR Rodgers¹, EC Ohki², and RC Chou¹

¹Dept. of Medicine, Geisel School of Medicine at Dartmouth College; ²Dept. of Interdisciplinary Natural Sciences, SUNY Buffalo.

36. Gamma oscillations in the rodent anterior limbic system: local generation or external source?

JE Carmichael, M Yuen, and M van der Meer

Dept. of Psychological and Brain Sciences

37. Rapamycin prevents neuronal overgrowth in Pten-knockout neurons

AK Conching, SA Getz, and BW Luikart

Dept. of Molecular & Systems Biology

STUDENT TALKS - Part 1

(11:00 AM - 12:00 PM)

1. A Synaptic Tag for Mapping Activity

Ryan J. O'Toole

Department of Biological Sciences, Dartmouth College

2. Persistent coding of outcome-predictive cue features in the rat nucleus accumbens

Jimmie Gmaz

Department of Psychological and Brain Sciences, Dartmouth College

3. Ventrolateral periaqueductal gray signals threat probability on rapid or ramping timescales

Kristina Wright

Department of Psychology, Behavioral Neuroscience, Boston College

4. Sex differences of leptomeningeal anastomoses reactivity and function in rats

Zhaojin Li

Department of Neurological Sciences, University of Vermont

LUNCH

(12:00 PM - 1:00 PM)

KEYNOTE LECTURE

(1:00 PM - 2:00 PM)

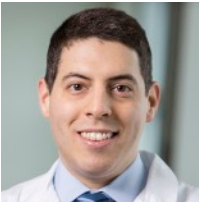
MIND & MACHINE PANEL DISCUSSION

(2:00 PM - 2:45 PM)



Rosalind Picard, ScD

Dr. Picard earned her bachelor's degree in electrical engineering with highest honors from the Georgia Institute of Technology, and master's and doctorate degrees in electrical engineering and computer science from MIT.



Joshua Aronson, MD

Dr. Aronson completed his undergraduate degree at MIT, his medical degree at Harvard Medical School and MIT, and a neurosurgery residency and fellowship at the Massachusetts General Hospital.



Emily Cooper, PhD

Dr. Cooper received a B.A. in Psychology and English Literature from the University of Chicago and a Ph.D. in Neuroscience from the University of California, Berkeley.



David Kotz, PhD

Dr. Kotz received his A.B. in Computer Science and Physics from Dartmouth College, and his PhD in Computer Science from Duke.



Xia Zhou, PhD.

Dr. Zhou earned her PhD in computer science from UC Santa Barbara and a master's degree from Peking University.

FACULTY TALKS

(3:00 PM - 4:00 PM)



Emily Cooper, PhD
Psychological & Brain Sciences, Dartmouth College

The potential for improving impaired vision with augmented reality

Visual perception relies on the ability to detect and interpret patterns of light in the natural environment. Normal visual function can be disturbed by damage anywhere along the visual pathways, from the eye to the brain. I will present work assessing strategies by which current-generation augmented reality systems might be used to improve the functional vision of people with low vision or blindness.



Barbara Jobst, MD
Dept. of Neurology, Dartmouth-Hitchcock Medical Center

One step forward: Brain stimulation and Cognition

Brain stimulation like that used to treat epilepsy and Parkinson's disease can be applied on a scheduled basis or in response to intracranial EEG. We developed a paradigm to deliver brain stimulation to improve memory based on intracranial EEGs. We identified poor memory encoding states, and improved memory with stimulation of the lateral temporal cortex in humans.. In parallel we developed a cognitive-behavioral program (HOBSCOTCH) that also improved patient memory.



Jeff Taube, PhD
Psychological & Brain Sciences, Dartmouth College

Are head direction cell responses commutative in 3D - and why it matters

Head direction (HD) cells fire based on an animal's perceived directional heading in the horizontal plane, independent of the animal's location or on-going behavior. Here, I will discuss the commutative properties of HD cells and how they respond during locomotion in the vertical plane. HD cells were recorded in rats as they traveled two routes along a cuboidal surface. HD cell responses were indeed commutative, supporting a dual-axis model that accounts for how they fire in the vertical plane

STUDENT TALKS - Part 2

(4:00 PM - 5:00 PM)

1. **Sex differences in corticostriatal local field potentials: Implications for alcohol drinking behavior**

Angela M. Henricks

Department of Psychiatry, Dartmouth-Hitchcock Medical Center

2. **Loss of Pten leads to increased microtubule polymerization in nascent dendritic processes**

Stephanie Getz

Department of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College

3. **Implantation of permanent responsive neuro-stimulator concurrent with explant of intracranial monitoring electrodes: a study on infection risk in immediate versus delayed stimulator implant**

Erin N D'Agostino

Geisel School of Medicine at Dartmouth College

4. **Circuit plasticity and inhibitory engrams in behavioral habituation**

Madhumala Sadanandappa

Department of Molecular and Systems Biology, Geisel School of Medicine at Dartmouth College