

# PENN CENTER FOR NEUROAESTHETICS (PCFN)

## 2022 REPORT







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## MESSAGE FROM THE DIRECTOR



Friday night, Thanksgiving weekend. I sat at my kitchen table staring at my laptop as I prepared to give a keynote address to the 24<sup>th</sup> National Academic Conference in Psychology (China). At the time, I was unaware that

more than 60,000 people were in attendance. From barely a whisper 20 years ago, neuroaesthetics is truly going global.

While China was still in a strict pandemic lockdown when I gave the talk, **emergence** was the theme at home. We welcomed a new artist in residence, Guggenheim award-winning glass artist, Judith Schaechter. Jeffrey Vadala, Director of Neurology's Virtual Reality lab, joined the PCfN, expanding our research tool-kit. We also welcomed three new post-docs – Mariola Paruzel-Czachura from Poland, Vicente Estrada Gonzalez from Mexico via Australia, and Vasilki Malateki from Greece via England – illustrating our international reach.

As travel opened up, our goal to be a hub for scholars interested in aesthetics took on new force. Visitors from Spain, Israel, and Slovakia and experts from various disciplines including architecture, design, wellness, and policy advocacy came to speak to us of their work.

Our core scientific mission to advance the understanding of **the nature of aesthetic experiences, how they are modifiable, and why they matter** continues. We delved into how culture affects the coupling of aesthetic and moral values, how interacting with nature contributes to wellbeing, and how to tackle deep questions about the transformational power of art. I speculated about the present and near future role of AI in art, a role that is both exciting and disturbing. On applications of neuroaesthetics, we began work at a mental health facility in LaPlata, Maryland to put principles of biophilia and neuroarchitecture into practice. In collaboration with the National Intrepid Center of Excellence at Walter Reed Hospital, we hope to harness the expressive power of art to help military personnel with post-traumatic stress symptoms better regulate their emotions. I was fortunate to feature in

several episodes of the terrific PBS series, *Closer to Truth*, that focused on the value of art.

In spring, we held our first networking gathering in PCfN Advisory Board member Kathy Sach's apartment in New York City. Ensclosed by her spectacular art collection, I commented on a Brice Marden picture from a neuroaesthetics perspective. Board members Dan Weiss and Rafael Viñoly added their reflections on art and the PCfN, remarks which were followed by a robust Q&A with those in attendance.

Our major effort this past year was hosting the biennial meeting of the International Association of Empirical Aesthetics (IAEA) in Philadelphia. IAEA is the major scientific society of scholars studying aesthetics. This meeting was to be the first in-person gathering since 2018. When we began organizing it a year ago, the uncertainties of Covid and war in Ukraine made planning a logistically challenging, and yet, hopeful undertaking.

The meeting worked out as well as we could imagine. Our locations at the Penn Museum and the Barnes Foundation (that co-sponsored the event) were fantastic, especially apt for a meeting dedicated to aesthetics. PCfN Advisory Board member Sheri Parks gave a stirring keynote address on aesthetics as a vehicle for social justice. Fellow board members Susie Ellis and Pauline Brown also attended. The number of students and young scholars reflected the burgeoning interest in scientific aesthetics. Eager exchanges of ideas during scientific sessions continued in restaurants and bars, extending well into the night. A public satellite symposium on neuroaesthetics at the Barnes Foundation capped off the meeting.

Heading into 2023, **even as the science of aesthetics and its applications flourishes, laying foundations for financial sustainability in pursuit of what may seem like a quixotic mission to some remains a priority.** Federal funding for neuroaesthetics remains scarce. In addition to private foundations, we depend on philanthropy and are deeply grateful for the generous donations we received. We strongly believe that aesthetics embodies our deepest values and has a profound impact on human relations, health, and wellbeing. We are energized by the many who share this conviction.

A handwritten signature in black ink, reading "Jeffrey Vadala".





EDUCATE  
THE NEXT  
GENERATION  
OF SCIENTISTS

ADVANCE  
RESEARCH IN  
BASIC AND  
APPLIED NEURO-  
AESTHETICS

ENGAGE  
WITH THE  
COMMU-  
NITY

OUR MISSION



FOSTER  
COLLABORATION  
WITH ALLIED  
DISCIPLINES AND  
CREATIVE  
EXPERTS

DISSEMINATE  
OUR SCIENCE,  
WITHIN AND  
BEYOND  
ACADEMIA

## ABOUT THE PENN CENTER FOR NEUROAESTHETICS (PCfN)

The PCfN launched in July 2018 with support from the University of Pennsylvania's Provost Office, The Perelman School of Medicine Dean's office, The Department of Neurology, The Department of Radiology, and The Center for Human Appearance. Ours is the first center in the US—and perhaps the world—dedicated to advancing cognitive neuroscience research in aesthetics.





# FOUNDATIONAL RESEARCH

The PCfN is motivated by a belief in the fundamental value of aesthetic experiences –they nourish the human spirit, inspire creativity and innovation, stimulate thought, bring people together, catalyze personal and social transformation, express values and meaning, and reveal the human condition.

The brain carves our visual world into people, places, and things. Using this neural organization as a framework, we investigate aesthetic experiences of these domains by asking the following questions:



WHAT ARE  
AESTHETIC  
EXPERIENCES?

HOW DO  
AESTHETIC  
EXPERIENCES  
VARY?

WHY DOES  
AESTHETICS  
MATTER?





# ADVISORY BOARD

Each member of the PCfN Advisory Board is a world-renowned expert in aesthetics and its applications. Their counsel on how best to achieve our mission is invaluable as our center continues to grow. For more information about each of our board members, please visit [our website](#).



**Pauline Brown**  
*Former Chairman of  
North America for LVMH  
Moët Hennessy Louis  
Vuitton.*

Brown brings extensive industry experience related to consumer behavior, beauty,

fashion, and luxury goods, and is the author of the groundbreaking business book *Aesthetic Intelligence* (HarperCollins, 2019).



**Katherine Sachs**  
*Philanthropist and Art  
Collector.*

A former curator at the Philadelphia Museum of Art, over the years, Sachs and her late husband Keith generously supported the arts at

both the PMA and University of Pennsylvania, including the establishment of The Sachs Program for Arts Innovation at Penn.



**Susie Ellis**  
*Chair & CEO Global  
Wellness Institute and  
Co-Founder, Chair, &  
CEO Global Wellness  
Summit.*

A leading authority on the global wellness economy, Ellis is widely

regarded as an industry trailblazer and known worldwide for her impact on global wellness trends and research.



**Rafael Viñoly**  
*Architect.*

Born in Uruguay, Viñoly settled in New York in 1979 from where he oversees an award-winning practice with projects spanning six continents. His local

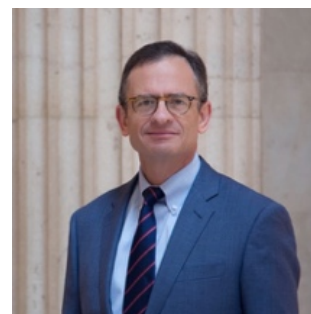
projects include the Kimmel Center for Performing Arts and the Perelman Center for Advanced Medicine at the Hospital of the University of Pennsylvania.



**Sheri Parks**  
*Ex-Vice President for  
Strategic Initiatives at the  
Maryland Institute  
College of Art (MICA).*

Park's research specializes in public aesthetics, particularly

the ways people find and create meaning and beauty in their everyday lives, with specific emphasis on race, gender, social class, sexuality, popular culture, and media.



**Dan Weiss**  
*President and CEO,  
Metropolitan Museum of  
Art.*

A scholar of art history and seasoned leader of academic departments and institutions, Weiss has written or edited six

books and many articles on the art of the Middle Ages and Crusades, higher education, museums, and American culture.



# IMPACTFUL RESULTS

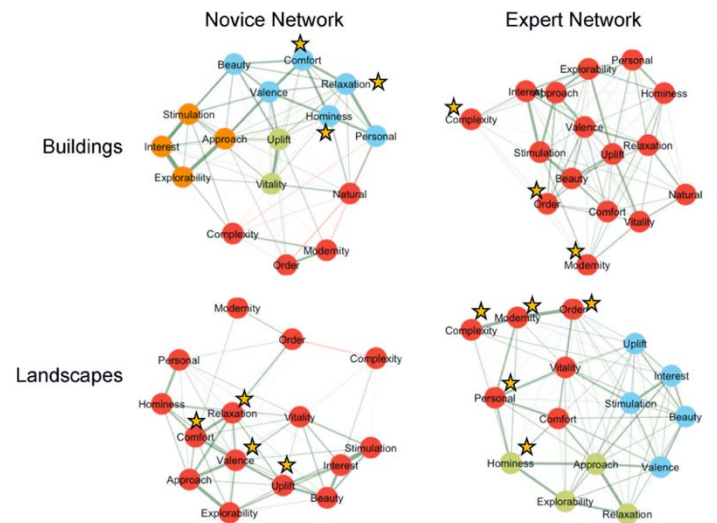
Experimental research, by its nature, advances knowledge incrementally. We made several important claims about the aesthetics of people, places, and things (art) over the past year.

## 1. PSYCHOLOGICAL RESPONSES TO BUILT & NATURAL SPACES

Aesthetic responses to the built and natural environment are organized along three dimensions – **Fascination** (is the space interesting?), **Coherence** (is the space ordered?), and **Hominess** (does the space feel personal and cozy?).

People differ in their aesthetic responses to built spaces. Uncovering the reasons for this variability informs the design of environments for people inhabiting these spaces.

Across studies, we find differences in the aesthetic impressions of architecture and design experts and novices. Coherence— how organized, ordered, and legible the space appeared – has a greater impact on the aesthetic judgment of experts than novices, whether they make rapid or deliberative assessments of built spaces.

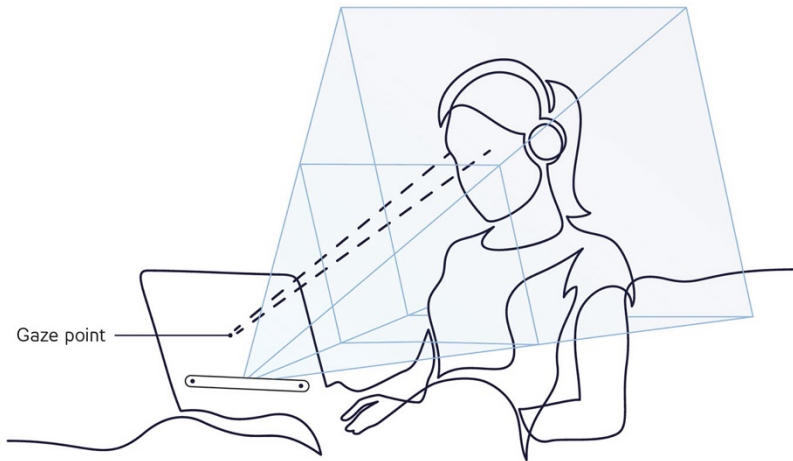


Stimulus images used in this experiment





## 2. ASSESSING CORRECTIVE SURGERY USING EYE-TRACKING



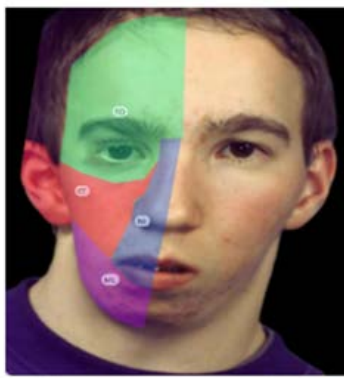
In collaboration with Dr. Jesse Taylor's lab at the Children's Hospital of Philadelphia and through the Center for Human Appearance, we investigated how **gaze patterns** are affected by facial anomalies such as developmental abnormalities.

People spent less time looking at the reconstructed area post-surgery, suggesting that the surgery was effective in normalizing visual interactions.

Levels of **negative biases**, **empathic concern**, and other **social dispositions** influence visual attention toward people with facial anomalies.

Those with greater implicit biases avoid looking at anomalous anatomy, while those who have more empathic concern and are better able to take alternate perspectives do not show avoidance behaviors.

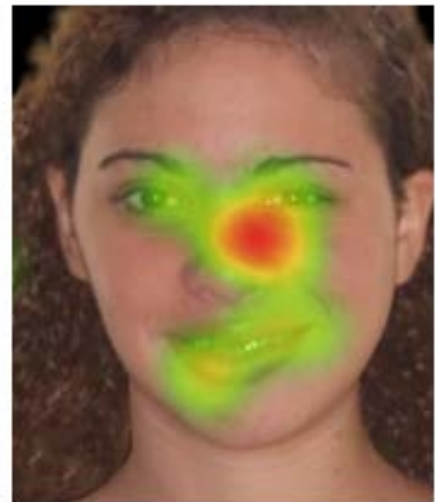
Regions of interest mapped onto each face



Pre-Treatment



Post-Treatment





### 3. IS OUR BIAS AGAINST FACIAL SCARS INNATE?

People have an **“anomalous-is-bad” stereotype** whereby they make negative inferences about the moral character of people with craniofacial anomalies like scars. This stereotype is often thought to be an evolutionary adaptation to avoid pathogens.

However, most work has been done on western populations, where scarred villains are a common trope in contemporary media.

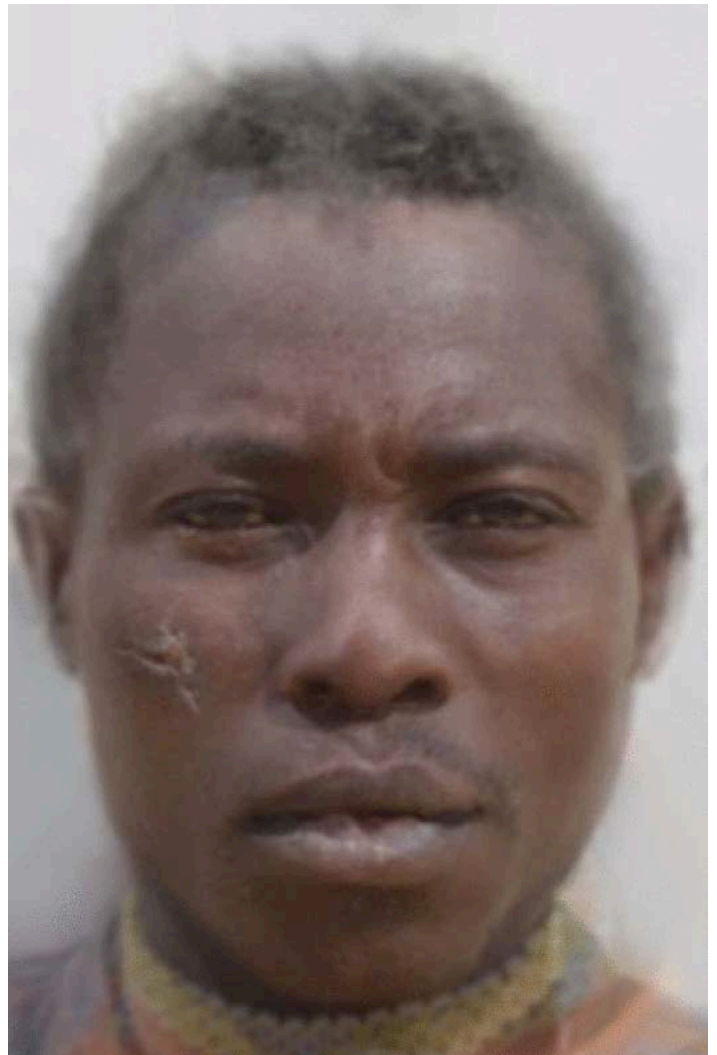
Does this bias exist outside of our cultural framework?

The Hadza are a hunter-gatherer tribe in Tanzania who have limited exposure to media.

We found Hadza with minimal exposure to outside cultures did not show stereotypical biases. These biases began to emerge among those who had exposure to non-Hadza culture.

These results are perhaps the first evidence suggesting **the anomalous-is-bad stereotype is culturally imposed.**

Image of a novel scarred Hadza face by Clifford Workman





## 4. AESTHETIC COGNITIVISM IN THE WILD

Aesthetic cognitivism (AC) is the philosophical view that engaging with art can stimulate knowledge and promote understanding.

Previously, to map the semantic space of AC we generated a **taxonomy of terms describing cognitive and emotional impacts of art engagement**.

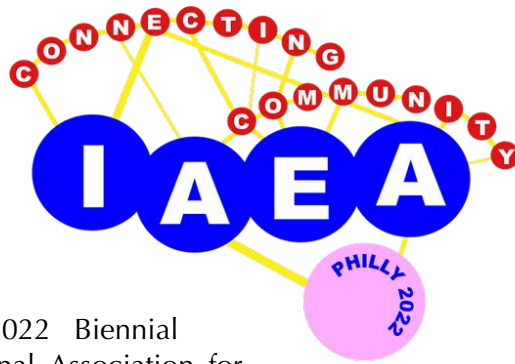
This past year we created a smartphone survey to query these potential impacts while people view art in natural environments, not just the lab.

In partnership with The Barnes Foundation and The Penn Museum of Anthropology and Archeology, we are investigating how **art impacts differ when viewing art in person in a gallery versus the increasingly common experience of viewing it digitally on a screen**.





# SPECIAL EVENT: IAEA 2022



The PCfN hosted the 2022 Biennial Congress of the International Association for Empirical Aesthetics along with The Barnes Foundation at the end of August.

The three-day meeting took place at two premier cultural sites in Philadelphia – The Penn Museum for Archeology and Anthropology and The Barnes Foundation – drawing over 160 researchers and creative professionals from North America, Europe, South America, Asia, and the Middle East.

We were honored to have Advisory Board member Sheri Parks kick off the meeting with a keynote address on the power of aesthetics in the service of social justice and Penn Professor Ken Lum address the re-valuation of the role of art and monuments in our public spaces. Similarly befitting our meeting's theme of "Connecting Community", The Barnes Foundation organized a public, satellite symposium on Neuroaesthetics the day after our meeting.

PCfN members presented on several topics, including: biophilic design and its impact on mood, the influence of facial anomalies on dehumanization, the cognitive and affective impacts of art engagement, brain associations of art therapy in veterans with PTSD, the influence of culture on aesthetic judgments of art, and the collaborative experience of our center's first artist-in-residency.



**170**  
attendees

**80+**  
institutions



Incredible keynotes by Sheri Parks and Ken Lum to top off a great first day! See you tomorrow ❤️ [#IAEA2022](#)



IAEA Philly 2022 Retweeted



**SheWhoRemains**  
@Dwaynica

Had a fantastic time yesterday speaking on 'Exploring theatre neuroscience: using wearable fNIRS to measure the sense of self and interpersonal coordination in professional actors.' Today is the last day of [@IAEA Philly 2022](#) 🥲 I look forward to today's talks! [#IAEA Philly 2022](#)



IAEA Philly 2022 Retweeted



**Maria Pombo**  
@mari\_pombo

Feeling so grateful to have had the opportunity to present my research at [#VSAC2022](#) and [#IAEA2022](#) the past couple of weeks. Two continents, two beautiful venues, and the chance to meet so many kind and talented members of the aesthetics community!



Penn Center for Neuroaesthetics





# SELECTED PCFN MEMBER HIGHLIGHTS

## New personnel

This year has been exciting for the lab! We welcomed three new postdocs and one researcher to the team.



**Vicente Estrada Gonzalez**  
*Postdoctoral Researcher*

When looking at artworks, viewers' eyes gather information that are articulated into narratives. Such narratives are responsible for the art viewer's aesthetic experience. During my PhD (at the University of New South Wales in Australia), I used eye-tracking technology to study the spatial and temporal dynamics of visual information collected while viewing paintings. I am also interested in how such dynamics vary as a function of the context and format in which paintings are encountered. This question is highly relevant to the art world because most human interactions with artworks occur with digital formats. For this reason, my research also focused on the difference between looking at paintings in the museum, in VR galleries and as digital reproductions. At the Penn Center for Neuroaesthetics, I am interested in how cognitive abilities and emotional states are influenced by nature-inspired designs in virtual reality. I completed a B.Sc. in Psychology at the Universidad Nacional Autonoma de Mexico, where I conducted basic research on the role of the endocannabinoid system in drug addiction. Outside the academy, I curated a project called Mexico Sensible in 2013.



**Vasiliki Meletaki**  
*Postdoctoral Researcher*

I am interested in how art and design can promote wellness and facilitate emotion regulation in general and clinical populations. My research interests include the influence of expertise and psychophysiological characteristics in aesthetic and emotional experiences. Before joining the lab, I worked in the Laboratory of Cognitive Neurosciences of CNRS in Marseille, examining interoceptive and psychological characteristics and bodily self in people with vestibular disorders. I received my PhD in Psychology from City, University of London investigating facial emotion perception and brain – body interactions on sensorimotor experts and specifically professional ballet dancers. Before that, I received my MSc. in Psychology from Coventry University where I fell in love with neuroscience investigating the neuroscience of creativity. Outside of the lab, you might find me dancing, traveling, baking, gardening, playing with my dog, or buying more books and plants.



### **Mariola Paruzel-Czachura**

*Postdoctoral Researcher*

I am a moral psychologist educated in psychology and philosophy (Ph.D.) and am extremely interested in aesthetics and morality. Specifically, how our perception of others' beauty shapes our perception of their morality and vice versa – how morality shapes beauty. This includes not only understanding beauty but also ugliness. That is why I study facial attractiveness, including the perception of people with anomalous faces and scars. Before joining the PCfN, I studied prisoners' moral judgments at the Complutense University of Madrid in Spain (Bekker Scholarship, NAWA). I am also affiliated with the University of Silesia in Katowice (Poland), my alma mater. Personally, I love surrealist art, fashion, and traveling. I am a happy wife and mum of two wonderful sons.



### **Veffrey Vadala**

*Researcher*

I am interested in human perception of landscapes and architectural spaces and how they shape both cognitive and cultural processes in contemporary and archaeological contexts. To explore this, my research uses virtual reality and augmented reality tools to explore the complexities of human perception at ancient Maya sites in the Yucatan and Belize. As the director of the Penn Neurology VR Laboratory, I currently work as a collaborator and software developer with the goal of bringing virtual and augmented reality approaches and experimental methods to neuroscience, psychology, anthropology, and medical researchers. I owe my interdisciplinary approach and perspectives to my Ph.D. in anthropological archaeology which I received from the

University of Florida in 2016 studying how the built and unbuilt landscapes at the Belizean site of Cerro Maya shaped human perception while structuring human and non-human relationships over time. I enjoy all things virtual, philosophy, playing music, making videos, and surreal humor.

### **Other updates**



Lab undergraduate researcher Amy Krimm was named a 2023 Marshall Scholar. Her project at the PCfN studies art engagement in museum and digital contexts. Next year, she will head to London to pursue master's degrees in psychology of the arts, neuroaesthetics, and creativity at Goldsmiths, University of London and in fine arts at Lancaster University. Congratulations, Amy!



Postdoctoral fellow Alex Christensen left Penn to start his own lab at Vanderbilt University. He is now an Assistant Professor of Quantitative methods in the department of Psychology and Human Development. He continues to consult with the PCfN on studies involving network science.

Congratulations, Alex!

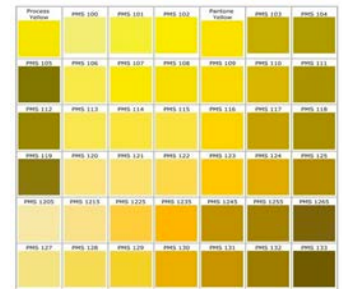
Postdoctoral fellows Kohinoor Darda and Adam Weinberger left the lab to pursue careers in UI/UX design. Nathaniel Klooster moved to Michigan to accept a position as Assistant Professor of Psychology at Hope College. We wish them all the best!



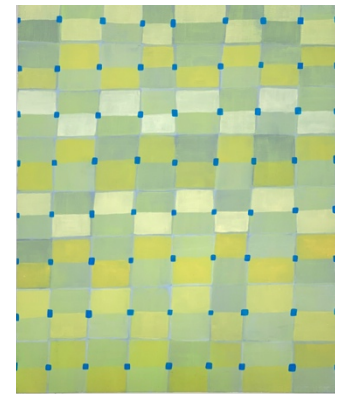
# ARTIST RESIDENCY UPDATE

## Artist-in-Residence: Lucas Kelly

For this collaborative experiment, our inaugural artist in residence, Lucas Kelly, generated a new set of paintings directly motivated by data collected by PCfN researchers. An explorer of the ephemeral nature of memory, Lucas' attention was piqued by a study led by Dr. Yoed Kenett in which participants were asked to recall in detail a memorable aesthetic experience and rate it along a range of possible emotional responses. Lucas generated a formal color system to code these emotions, then created a series of paintings using this color system that combined personal narrative with participants' collective experiences. This residency was generously funded by the Sachs Program for Arts Innovation at the University of Pennsylvania.



Example of novel color-coding of different degrees of felt beauty



Images courtesy of Lucas Kelly and Platform Gallery.

## Artist-in-Residence: Judith Schaechter

Judith Schaechter joined the lab this year. Her work is collected internationally and is represented in the collections of the Metropolitan Museum in New York, the Victoria and Albert in London and the Hermitage, among others. She is the recipient of many awards including the Guggenheim Fellowship in 2005 and her work was in the 2002 Whitney Biennial. In 2013, Judith was inducted to the College of Fellows of the American Craft Council. She received a lifetime achievement award from the Glass Art Society in 2022.

In 2020-21, Judith's work was the subject of a retrospective exhibition organized by the Memorial Art Gallery of Rochester, NY, which traveled to the Toledo Museum and the Des Moines Art Center.



# MEDIA

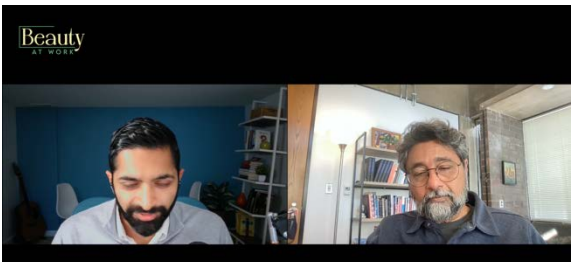
Publicizing neuroaesthetics is an important strand of our outreach efforts. We have been featured in popular media broadcasts and in print interviews. We also leverage our blog posts to directly inform the public about our research.

## VIDEO: TV, FILM, AND WEB



### [Closer to Truth Season 20](#)

- EP1 [Art Seeking Understanding 1: Foundations](#)
- EP2 [What is Philosophy of Art?](#)
- EP3 [Can the Brain Explain Art?](#)
- EP4 [Can Art Clarify The Mind-Body Problem?](#)



### [Beauty and the Brain: The Science of Neuroaesthetics - Anjan Chatterjee.](#)

Beauty at Work (December 2, 2022).

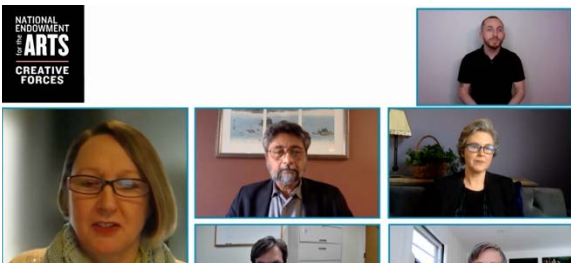
The Beauty at Work podcast is sponsored by the Templeton Religion Trust.



### [Anjan Chatterjee: An Interview by John Vogel.](#)

TalkingWriting.com (June 20, 2022).

Anjan Chatterjee talks about funding for the arts, his own photography, and making a case for why art matters.

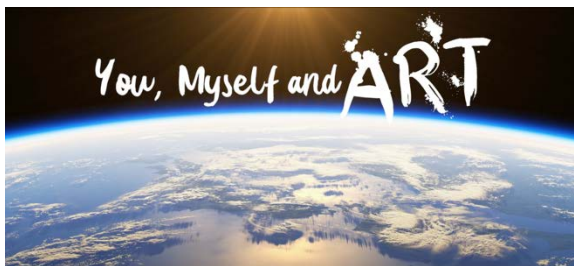


### [Built to Scale: Creative Forces' Clinical Research Expansion.](#)

Creative Forces: NEA Military Healing Arts Network (March 23, 2022).

A discussion with investigators of new art therapy and music therapy studies being supported by the Creative Forces: NEA Military Healing Arts Network, including the PCfN's work.





[You, Myself, and Art.](#)  
TMW Media Group (February 2022).

Additional: [You, Myself, and Art \[Trailer\]](#). EGX Film Factory (February 2, 2021).

Do aesthetic emotions exist as a distinct class of emotions?

**Yes, they do!**

...as a class of emotions that constitute our appreciation of cultural artifacts and art (domain-relevant)

[Panel Discussion: The Concept of Aesthetic Emotions in the Age of Neuroaesthetics.](#)

International Association of Empirical Aesthetics (January 24, 2022).

Do aesthetic emotions exist? Anjan Chatterjee and Joerg Fingerhut argue in favor of the concept against Marcos Nadal and Martin Skov.



[YouTube Channel: Penn Center for Neuroaesthetics](#)

Continually updated with new content related to work at the PCfN—includes a [Neuroaesthetics Playlist](#)

## AUDIO

[Your Brain on Art | UPenn's Anjan Chatterjee on the neuroscience behind artistic experiences.](#) The Art and Happiness Project.

[The brains behind how we perceive beauty.](#) RNZ (October 12, 2022).

[Talking Power, Privilege and Community with Kohinoor Darda.](#) ReproducibiliTEA podcast, S2E09 (26 August, 2022).

[Your Brain on Nature: Neuroaesthetics and Biophilia with Dr. Anjan Chatterjee.](#) Biophillic Solutions podcast (April 26, 2022).

[The Connection of the Brain and Beauty.](#) The Art Elevator (February 1, 2022).

[You're Beautiful, You're Good; You're Unusual, You're Threatening.](#) (In)Coherence (January 10, 2022).

## IN PRINT

[New study finds that small facial scars don't have a significant negative impact on attractiveness.](#) Psych News Daily (November 30, 2022).

[Multidisciplinary panel highlights role of the arts in human flourishing.](#) Penn Today (October 26, 2022).

[Adam Levine, The Try Guys, Fishing: Cheating Is Hot.](#) BuzzFeed News (October 23, 2022).

[Nonprofit uses art to help dementia patients unlock language and emotion.](#) Grid Philly (October 2, 2022).

[Can nature-inspired designs affect cognition and mood?](#) Penn Today (July 26, 2022).

[Lucas Kelly, Professor of Fine Arts and Director of The Gallery at MCCC, Is Living Proof that Perseverance Can Lead to Success in the Arts.](#) News @ Mercer Community College (June 14, 2022).

[Mercer County College Professor of Fine Arts, Lucas Kelly, Inaugural Artist in Residence at Penn Center for Neuroaesthetics Focuses on Memory to Create Art.](#) New Jersey Stage.

[Why are we attracted to some art but not others?](#) Daily Maverick (April 6, 2022).

[Neurocognitive Research Examines Why People With Facial Anomalies Are Regarded as Having Flawed Characters.](#) PsyPost (January 13, 2022).



Mural by Dan Kitchner, photographed by Anjan Chatterjee





## BLOG SERIES:

### *Beauty, Brain, and Behavior in Psychology Today*



#### Stories in our Brain.

*January 2022*

What does it mean to get lost in a story? Do we still notice the language used by the writer? How do we experience emotions as we follow protagonists through their adventures?



#### Is Good Also Beautiful?

*April 2022*

We hypothesized that “good-is-beautiful” and “bad-is-ugly” stereotypes also exist: good people are seen as more attractive and bad people as less attractive.



#### Why Do We Look Down on People Who Look Different?

*July 2022*

Where do negative associations with facial anomalies come from? Negative cultural messages, not evolutionary pathogen avoidance, could be the source of the anomalous-is-bad stereotype.



#### Is It True That Nature Is Good for Our Brains?

*September 2022*

A recent, important study reported beneficial changes in neural activity after a walk in the woods not seen after a city walk. But not all nature is equally relaxing.



#### Rings of Power and Privilege.

*November 2022*

Most people have a negative implicit bias against people with facial anomalies, such as scars, birthmarks, and developmental abnormalities. Research shows that culture plays an important role in engendering these biases.



#### The Robots Are Coming, the Robots Are Coming.

*December 2022*

Aesthetically sensitive machines will challenge our views of beauty and creativity and perhaps our understanding of the nature of art.





## PCFN MEMBERS

### Core Faculty and Staff

Anjan Chatterjee, Director  
Eileen Cardillo, Associate Director  
Bella Bobrow, Lab Manager

### Postdoctoral Researchers

Kohinoor Darda  
Vicente Estrada Gonzalez  
Vasiliki Meletaki  
Mariola Paruzel-Czachura  
Cliff Workman

### Art Historian

Jonathan Fineberg

### Artist-in-Residence

Lucas Kelly\*  
Judith Schaechter

### VR Specialist

Jeffrey Vadala\*

### Student Researchers

Amy Krimm, Undergraduate Student  
Mar Llorens Gamez, Visiting Scholar\*  
Zuha Nasim, Undergraduate Student  
Will Sturgeon, Undergraduate Student  
Connor Wagner, Medical Student

\*Not pictured





# COLLABORATORS

## AFFILIATED FACULTY AT PENN

Coren Apicella, School of Arts & Sciences  
Mikael Avery, Weitzman School of Design  
Danielle Bassett, School of Engineering  
Liz Brannon, School of Arts & Sciences  
John A. Detre, Perelman School of Medicine  
Martha J. Farah, School of Arts & Sciences  
Gary Hatfield, School of Arts & Sciences  
Elizabeth Johnson, Wharton School of Business  
Joe Kable, School of Arts & Sciences  
Michael Leja, School of Arts & Sciences  
Ken Lum, Weitzman School of Design  
Allyson Mackey, School of Arts & Sciences  
Lynn Meskell, School of Arts & Sciences  
Matt Neff, Weitzman School of Design  
James O. Pawelski, School of Arts & Sciences  
Rebecca L. Pearl, Perelman School of Medicine  
Michael Platt, Wharton School of Business  
Megan S. Ryerson, Weitzman School of Design  
Frederick Steiner, Weitzman School of Design  
Nina Strohminger, Wharton School of Business  
Jesse Taylor, Children's Hospital of Philadelphia  
Orkan Telhan, Weitzman School of Design  
Ian Verstegen, School of Arts & Sciences  
Linton A. Whitaker, Perelman School of Medicine



## NATIONAL AND INTERNATIONAL COLLABORATORS

Amy Belfi, Missouri Univ. of Science & Technology  
Beatriz Calvo-Merino, City, University of London  
Alex Christensen, Vanderbilt University  
George Christopoulos, Nanyang Tech. Univ.  
Maurizio Forte, Duke University  
Fraziska Hartung, Newcastle University  
Gregor Hayn-Leichsenring, University Hospital Jena  
Dexian He, South China Normal University  
Xianyou He, South China Normal University  
Stacey Humphries, Goldsmiths, University of London  
Yoed Kenett, Technion  
Juliet King, NICoE

Nathaniel Klooster, Hope College  
Alexander Kranjec, Duquesne University  
Helmut Leder, University of Vienna  
Marcos Nadal, University of the Balearic Islands  
Janell Payano Sosa, NICoE  
William M. Perthes, The Barnes Foundation  
Chandler Rhodes, NICoE  
Martin Skov, Copenhagen Univ. Hospital Hvidovre  
Oshin Vartanian, University of Toronto  
Edward A. Vessel, Max Planck Inst. for Empirical Aesthetics  
Melissa Walker, NICoE  
Jennifer Walsh



## AFFILIATED GROUPS



**PENN MUSEUM**



**GLOBAL WELLNESS  
INSTITUTE™**  
EMPOWERING WELLNESS WORLDWIDE

**THE SACHS  
PROGRAM  
FOR ARTS  
INNOVATION**  
UNIVERSITY of PENNSYLVANIA

**mindCORE**  
Center for Outreach, Research, and Education

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*Photos by Anjan Chatterjee*



Penn Center for Neuroaesthetics







## INVITED TALKS

Invited talks are one indicator of our reputation and the impact of our work. We have disseminated our research findings to neurology and neuroscience audiences, interdisciplinary humanities programs, technology groups, and student organizations.

Anjan Chatterjee. **Human Beauty and Morality**. Shandong University. China (6 Jan 2022)

Anjan Chatterjee. **Human Beauty**. Penn Plastic Surgery Grand Rounds (13 Jan 2022)

Anjan Chatterjee. **Object Lessons**. The Center for Art in Wood, Philadelphia. (4 Feb 2022)

Anjan Chatterjee. **Architecture and Wellness**. Panel discussion. Columbia University. (28 Feb 2022)

Kohinoor Darda. **The role of art expertise and culture in human- and computer-generated visual art appreciation**. Indian Institute of Information Technology (IIIT), Hyderabad (9 March 2022)



Anjan Chatterjee. **MINDcore Behind the CV** seminar, University of Pennsylvania (17 March 2022)

Kohinoor Darda. **Feminist approaches to open science.** Virtual panel discussion organized by the United Nations Dag Hammarskjöld Library (31 March 2022)

Villavisanis, D.F., Workman, C.I., Cho, D.Y., Zapatero, Z.D., Wagner, C.S., Cheung, L.L., Blum, J.D., Bartlett, S.P., Swanson, J.W., Chatterjee, A., & Taylor, J.A. **It's All Relative: Associations of Facial Proportionality, Attractiveness, and Character Traits.** 79th Annual Meeting of the American Cleft Palate-Craniofacial Association, Fort Worth, TX, USA. (29 March 2022)

Villavisanis, D.F., Workman, C.I., Zapatero, Z.D., Vu, G.H., Blum, J.D., Cheung, L.L., Cho, D.Y., Swanson, J.W., Bartlett, S.P., Chatterjee, A., & Taylor, J.A. **A Prospective Eye-Tracking Study of Visual Attention and Bias Toward People with Facial Anomalies.** 79th Annual Meeting of the American Cleft Palate-Craniofacial Association, Fort Worth, TX, USA. (29 March 2022)

Kohinoor Darda. **Domain-general and domain-specific neural mechanisms underlying action and movement perception and imitation.** Social neuroscience research seminar, Utrecht University (1 April 2022)

Anjan Chatterjee. **Brain in Art.** Keynote panel. Caine College of the Arts, Utah (15 April 2022)

Farhan Jivraj. **Exploring the Cognitive and Creative Effects of Biophilic Interior Design.** Neuroscience Honors Student Research Symposium, University of Pennsylvania (17 April 2022)

Anjan Chatterjee. **Human Beauty.** Presentation for the Center on Human Appearance Board of Trustees (20 April 2022)



Anjan Chatterjee. **Parkinson's Disease and Art.** Philadelphia Museum of Art, sponsored by the Parkinson's Council (22 April 2022)

Adam Weinberger. **Exploring functional brain network modularity in educational contexts.** Cognitive Neuroscience Society Annual Meeting (23 April 2022)

Adam Weinberger. **Psychological and Neural Responses to the Built Environment.** Society for Neuroscience of Creativity Meeting (13 May 2022).

Adam Weinberger. **Neuroaesthetics of the Built and Natural Environment.** International Possibility Studies Conference (17 May 2022).

Kohinoor Darda. **The Computer, A Choreographer? Aesthetic Responses to Computer-Generated Dance Choreography.** International Conference of Cognitive Neuroscience Meeting. (19 May 2022)



Kohinoor Darda. **Feminist ways of doing - resources for feminist ways of doing science.** Society for the Improvement of Psychological Sciences Annual Meeting (27 June 2022)

Kohinoor Darda. **Promoting Inclusivity in Informal and Professional Open Science Contexts.** Society for the Improvement of Psychological Sciences Annual Meeting (28 June 2022)

Kohinoor Darda. **Stimulus and knowledge cues to human animacy and their link to aesthetic appreciation.** European Society for Cognitive and Affective Neuroscience (ESCAN) meeting (20 July 2022)

Kohinoor Darda. **Is dance appreciation universal?** Symposium: Emerging multi-disciplinary perspectives and cutting-edge advancements in dance neuroaesthetics. European Society for Cognitive and Affective Neuroscience (ESCAN) meeting (20 July 2022)

Anjan Chatterjee. **Neuroaesthetics.** Neuroergonomics & NYC Neuromodulation Conference (29 July 2022)

Anjan Chatterjee. **Neuroaesthetics.** Talk presented to Hospital of the University of Pennsylvania Executive Team (10 August 2022)

Kohinoor Darda. **Does the frame of an artwork matter? Cultural framing and aesthetic judgments for abstract art.** International Association of Empirical Aesthetics (1 Sept 2022)

Cliff Workman. **The (mis)perception of facial affect in people with visible differences.** International Association of Empirical Aesthetics (2 Sept 2022)

Farhan Jivraj. **Biophilic design and its impact on mood and cognition.** International Association of Empirical Aesthetics (2 Sept 2022)

Anjan Chatterjee. **Neuroaesthetics.** Talk presented at Neuroaesthetics: A Public Symposium. The Barnes Foundation, Philadelphia (3 Sept 2022)

Jeffrey Vadala. **The Development of Virtual Reality Neuro-Anthropology (VRNA).** UNLV Department of Anthropology Proseminar Series (3 Oct 2022)

Anjan Chatterjee. **The Arts and Human Flourishing.** Panel discussion. Penn Museum of Archeology and Anthropology (22 Oct 2022)





Mariola Paruzel-Czachura. **Improving Big Team Science for Individual Researchers.** 2022 Big Team Science Conference (27-28 Oct 2022)

Anjan Chatterjee. **What's in a Smell? The Art and Science of Human Perception.** Panel discussion. Institute of Contemporary Arts (9 Nov 2022)

Anjan Chatterjee. **The Neuroaesthetics of People and Places.** Keynote at the 24<sup>th</sup> National Academic Conference of Psychology (China). (25 Nov 2022)

Anjan Chatterjee. **The Neurobiology of Aesthetic Experience.** Hadassah University. Jerusalem (7 Dec 2022)

Jonathan Fineberg. **Gifts of Seeing: Picasso, Klee & Zhang Xiaogang As Children.** Beijing (30 Dec 2022)





# PUBLICATIONS

Adamaszek, M., Cattaneo, Z., Ciricugno, A. & Chatterjee, A. (2022). The Cerebellum and beauty: The impact of the cerebellum on art experience and creativity. In: Adamaszek, M., Manto, M., Schutter, D.J.L.G. (eds) *The Emotional Cerebellum: Advances in Experimental Medicine and Biology*, vol 1378. Springer, Cham. [https://doi.org/10.1007/978-3-030-99550-8\\_14](https://doi.org/10.1007/978-3-030-99550-8_14)

Chatterjee, A. (2022). Art in the Age of Artificial Intelligence. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1024449>

Christensen, A. P., & Kenett, Y. N. (2022). Semantic network analysis (SemNA): A tutorial on preprocessing, estimating, and analyzing semantic networks. *Psychological Methods*. <https://doi.org/10.1037/met0000463>

Coburn, A., Weinberger, A., & Chatterjee, A. (2022). How architectural design influences emotions, physiology, and behavior. In Skov, M. & Nadal, M. (Editors), *The Routledge International Handbook of Neuroaesthetics*.

Darda, K., Bara, I., & Cross, E.S. (2022). Movement Appreciation. In Skov, M. & Nadal, M. (Editors) *The Routledge International Handbook of Neuroaesthetics*.

Darda, K.M., Cross, E.S. (2022). The role of expertise and culture in visual art appreciation. *Scientific Reports* 12, 10666. <https://doi.org/10.1038/s41598-022-14128-7>

Denervaud, S., Christensen, A. P., Kenett, Y. N., & Beaty, R. E. (2022). Education shapes the structure of semantic memory and impacts creative thinking. *Science of Learning*, 6, 35. <https://doi.org/10.1038/s41539-021-00113-8>

Fineberg, J. The Ineffable, the Unspeakable, and the Inspirational: A Grammar," *The Cleveland Review of Books* (June 2022): <https://www.clereviewofbooks.com/home/jonathan-fineberg-a-grammar-essay>

Fineberg, J. *Water, Wind, Breath: Southwest Native Art in Community*," *The Brooklyn Rail* (April 2022): <https://brooklynrail.org/2022/04/artseen/Southwest-Native-Art-in-Community>

Han, H., Workman, C.I., May, J., Scholtens, P., Dawson, K.J., Glenn, A.L., & Meindl, P. (2022). Which moral exemplars inspire prosociality? *Philosophical Psychology*. <https://doi.org/10.1080/09515089.2022.2035343>



He, D., Workman, C.I., He, X., & Chatterjee, A. (2022). What is Good is Beautiful (and What isn't, isn't): How Moral Character Affects Perceived Facial Attractiveness. *Psychology of Aesthetics, Creativity, and the Arts*. <https://doi.org/10.1037/aca0000454>

Villavisanis, D.F., Workman, C.I., Cho, D.Y., Zapatero, Z.D., Wagner, C.S., Cheung, L., Blum, J.D., Bartlett, S.P., Swanson, J.D., Chatterjee, A., & Taylor, J.A. (2022). It's All Relative: Associations of Facial Proportionality, Attractiveness, and Character Traits. *Journal of Craniofacial Surgery*. <https://doi.org/10.1097%2F01.GOX.0000828408.86704.05>

Villavisanis, D.F., Workman, C.I., Zapatero, Z.D., Vu, G.H., Humphries, S., Cho, D.Y., Cheung, L., Blum, J.D., Swanson, J.D., Bartlett, S.P., Chatterjee, A., & Taylor, J.A. (2022). Visual Perceptions of Hemifacial Microsomia Reconstruction: A Prospective Study with Eye Tracking Technology and Mixed Linear Effects Models Analysis. *Plastic and Reconstructive Surgery*. <https://doi.org/10.1097/01.GOX.0000828596.70420.5f>

Villavisanis, D.F., Workman, C.I., Zapatero, Z.D., Vu, G.H., Humphries, S., Cho, D.Y., Cheung, L., Blum, J.D., Swanson, J.D., Bartlett, S.P., Chatterjee, A., & Taylor, J.A. (2022). Visual Attention Toward Patients with Hemifacial Microsomia Reconstruction: A Prospective Eye-Tracking Study. *Plastic and Reconstructive Surgery*, 1-21.



Villavisanis, D. F., Workman, C. I., Cho, D. Y., Zapatero, Z. D., Wagner, C. S., Blum, J. D., ... & Taylor, J. A. (2022). Associations of Facial Proportionality, Attractiveness, and Character Traits. *Journal of Craniofacial Surgery*, 33(5), 1431-1435. <https://doi.org/10.1097/SCS.00000000000008662>

Workman, C.I., Smith, K.S., Apicella, C.L., & Chatterjee, A. (2022). Evidence against the "anomalous-is-bad" stereotype in Hadza hunter gatherers. *Scientific Reports*. 12(8693):1-10. <https://doi.org/10.1038/s41598-022-12440-w>

Zapatero, Z. D.; Workman, C. I., Kalmar, C. L.; Humphries, S.; Kosyk, M. S.; Carlson, A. R.; Swanson, J. W.; Chatterjee, A.; Taylor, J. A. (2022). Facial Scars: Do Position and Orientation Matter? *Plastic and Reconstructive Surgery*. doi: [10.1097/PRS.00000000000009728](https://doi.org/10.1097/PRS.00000000000009728)

Weinberger, A. B., Garside, E. W., Christensen, A. P., & Chatterjee, A. (2022). Effects of expertise on psychological responses to buildings and natural landscapes. *Journal of Environmental Psychology*, 84, 101903. <https://doi.org/10.1016/j.jenvp.2022.101903>



# FINANCIAL SUPPORT

We aim to harness neuroscience in advocating for the vital importance of aesthetics values. Moving through uncharted scientific territory is challenging when traditional funding sources are cautious in their research agendas. Philanthropic gifts are critical to realizing our vision.

## GRANTS & AWARDS

Anjan Chatterjee was awarded a **3-year grant from the Templeton Religion Trust** titled, ***Semantic Space of Aesthetic Cognitivism***. This project investigates conditions under which art encourages the understanding posited by Aesthetic Cognitivism.

Anjan Chatterjee received an award to conduct a pilot study jointly with the National Intrepid Center for Excellence (NICoE) at the Walter Reed Military Medical Center **from the Henry M. Jackson Foundation and National Endowment for the Arts**, titled ***Art Therapy and Emotional Wellbeing in Military Populations with Post Traumatic Stress Disorder (PTSD)***.

## GIFTS

In May of 2022 we hosted our first annual Networking Reception in Tribeca, New York. We are grateful to Advisory Board member Katherine Sachs for generously hosting this lively evening at her residence, and for the enthusiasm and support of the attendees.

We are grateful to Mr. Steven Smith and Mr. Sean Smith for their generous ongoing contributions to our program through the Dolores Smith Innovation fund and ALPAS fund.

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Ms. Pauline Brown  
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Ms. Katrine Fornby  
Mr. & Mrs. Harry Macklowe  
Ms. Melissa Marsh

Mrs. Katherine Sachs  
Mr. Roman Viñoly  
Mr. Rafael Viñoly  
Dr. Dan Weiss/Wallace Special Project  
Dr. Sheri Parks



Katherine Sachs, Anjan Chatterjee, and Bella Bobrow at the PCfN's inaugural networking reception.

For this fledgling field, **your gift** makes a big impact on advancing our understanding of how appearance affects the way we treat each other, how the built environment affects our sense of wellbeing, and why art at every level nourishes our deepest sense of humanity.

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