



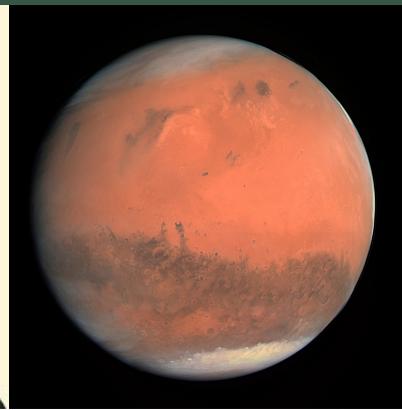
UNIVERSITY OF
LIVERPOOL

Time:
10am - 5pm
(GMT)

A virtual symposium bringing together researchers, students, industry partners and geoscience enthusiasts.

HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE' SATURDAY 12TH FEBRUARY

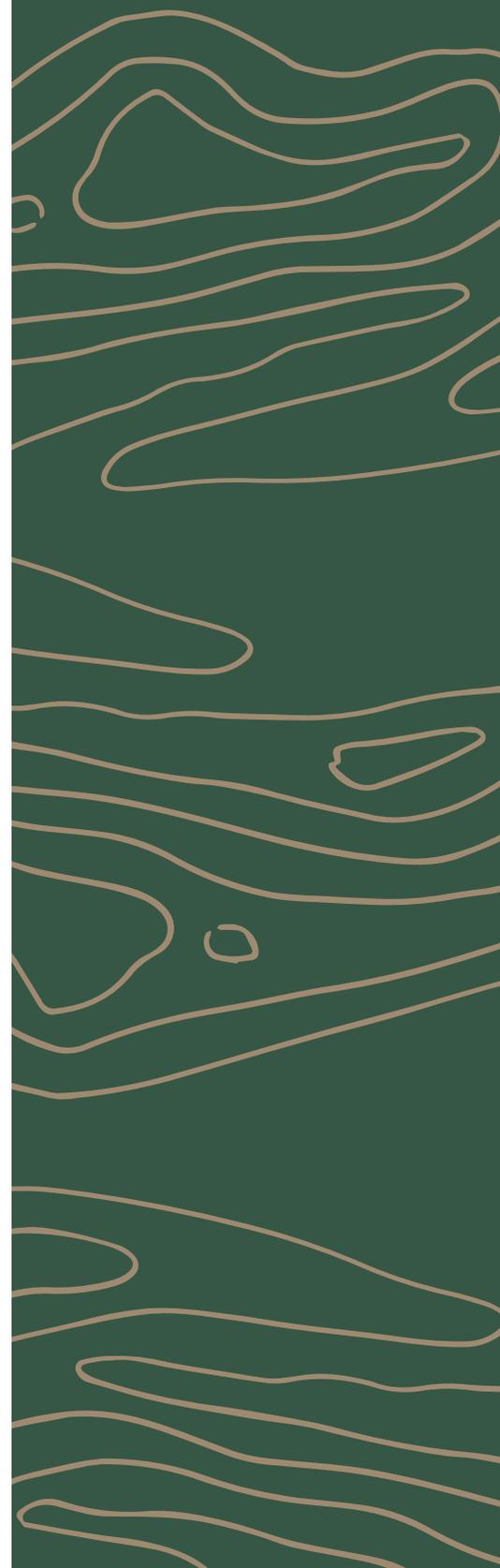


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SYMPOSIUM
2022

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

CODE OF CONDUCT

The Herdman Symposium is a representation of the wider global geoscience community and thus has a duty and obligation to provide a safe and welcoming environment for members and the public regardless of ethnicity, gender, sexual orientation, religion, physical ability, geographic location, career stage, physical appearance, and socioeconomic background. Our code of conduct must be followed during participation in our event. We expect all participants to uphold the principles of this Code of Conduct and act accordingly during the talks and while using our virtual networking space.

1. Inclusion.

We welcome and support peoples of all backgrounds and identities, which includes but is not limited to peoples of all ethnicities, genders, sexual orientations, political orientations, religions, physical abilities, geographic locations, career stages, physical appearances, and socioeconomic backgrounds.

2. Behaviour.

We aim for an intellectually stimulating and supportive space for all members. Science is made richer by discussion and constructive criticism, but that is no excuse for disrespectful behaviour. We expect all members to adopt a behaviour that is professional, curious, kind, and respectful. We expect all participants to behave in a safe and responsible manner, to be mindful of how their language and actions are perceived by others, and to treat all spaces and equipment with care and respect.

3. Harassment and Unacceptable Behaviour.

We have a zero-tolerance policy on harassment, inappropriate comments, and criminal offences. Harassment includes sustained disruption of talks, or, any non-consensual sexual attention, innuendos, deliberate intimidation, threats of violence, stalking, and photography or recording of an individual without consent, personal insults, and advocating for any of the above-mentioned behaviour. Inappropriate comments include disrespectful or stereotyping comments about race, gender, sexual orientation, religion, physical ability, geographic location, career stage, physical appearance, and socioeconomic background as well as any sexist, racist, and/or exclusionary comments, statements, or jokes.

4. Academic Misconduct.

Academic misconduct includes, but is not limited to plagiarism, failure to recognize contribution of others, and fabrication or falsification of research data.

5. Breach of the Code of Conduct.

Anyone who breaches the code of conduct is expected to immediately stop the inappropriate behaviour. Violations to the code of conduct may result in a verbal warning, removal from the event and/or banning from future events. In the case of an incident occurring outside of event the aggrieved party or witnesses are encouraged to report it to one of the Herdman Society committee members. We understand that reporting a traumatic event is difficult, and we are committed to listening fully and compassionately. Once notified the committee member will discuss the details separately with all parties involved before choosing the appropriate next steps. Confidentiality of all incidents will be maintained if it does not infringe on another party's rights.

HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

ITINERARY

- 10:00** **Welcome to the Herdman Symposium 2022**
Presentation by Aidan Hernaman (Herdman Society President).
Introductions from Dr Janine Kavanagh (Senior Lecturer, University of Liverpool), Chris Gilsenan and Sam King (Herdman Symposium Secretaries).
- 10:10** **Professor Dan Faulkner, University of Liverpool:**
'Journey to the Centre of the Earthquake'
- 11:10** Coffee Break (GatherTown) - 10 minutes
- 11:20** **Dr Natasha Dowey, Sheffield Hallam University:**
'How can we create a more sustainable and equitable Geoscience for the future?'
- 12:20** **Professor Mike Benton, University of Bristol:**
'Dinosaurs: New Visions of a Lost World'
- 13:20** Lunch Break (GatherTown) - 25 minutes
- 13:45** **Dr Taija Torvela, University of Leeds:**
'The key role of metals and geoscience in the transition to a low carbon future'
- 14:45** **Dr Paula Koelemeijer, Royal Holloway University of London:**
'Landscapes below our feet: What we can learn about them from the music of the Earth'
- 15:45** Coffee Break (GatherTown) - 10 minutes
- 15:55** **Divya M. Persaud, NASA JPL (USA):**
'Remote Sensing the Solar System in 3D'
- 16:55** **Final Remarks and Regards (GatherTown) - ~10 minutes**

HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

SATURDAY 12TH FEBRUARY

'Journey to the Centre of the Earthquake'



Professor Dan Faulkner
Geology and Geophysics,
University of Liverpool (UK)

ABSTRACT

TALK 1

Earthquakes are a dramatic result of our dynamic planet. They pose a huge issue to the world's population in terms of loss of life and damage to critical infrastructure. Recent research tells us that tectonic faults can creep slowly, produce 'slow' earthquakes over days, or fast earthquakes that travel at supersonic speeds. What have we learnt about earthquakes over the past few years that helps us to understand these different types of faulting movements? This presentation will outline different types of tectonic fault slip and explore the methods we are currently using to enhance our understanding of earthquakes.

BACKGROUND

Dan Faulkner is a Professor in Geology and Geophysics at the University of Liverpool. He has a keen interest in understanding how rocks deform through field studies and squashing rocks and making mini-earthquakes in the laboratory. This has led to new understanding about the properties of tectonic faults, different types of fault slip, and earthquakes. Apart from these research activities he is currently Head of Department in Liverpool and the President-elect for Tectonophysics for the American Geophysical Union.



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10:10am (GMT)

VIRTUAL LECTURE

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

SATURDAY 12TH FEBRUARY

'How can we create a more sustainable and equitable Geoscience for the future?'

ABSTRACT

TALK 2

Geoscience is crucial to a more sustainable future. But for the discipline of geoscience itself to be sustainable, we must tackle falling student recruitment, face up to a lack of public awareness, modernise and decolonise our curricula, and tackle the diversity crisis that has long plagued our subject. This talk will consider why geoscience is so important to sustainable development, discuss the legacies holding our subject back, and explore initiatives and research aiming to make geoscience fit for the future.



Dr Natasha Dowey
Phys. Geography, Sheffield
Hallam University, (UK)

BACKGROUND

Natasha is a Senior Lecturer in Physical Geography specialising in volcanology, with seven years' industry experience of investigating sedimentary environments and subsurface risk in the energy sector. Her research focuses on uncertainty in the analysis and communication of explosive volcanic hazards, and on sustainability, diversity and inclusion in geoscience. Natasha is also Editor of the website 'Geoscience for the Future' and is passionate about promoting the importance of geoscience in a more sustainable society.



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11:20am (GMT)

VIRTUAL LECTURE

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

SATURDAY 12TH FEBRUARY

'Dinosaurs: New Visions of a Lost World'



Professor Mike Benton
Vertebrate Palaeontology,
University of Bristol, (UK)

ABSTRACT

TALK 3

Twenty-five years ago, the first feathered dinosaur was reported, *Sinosauropteryx*. There has been a revolution in dinosaur palaeobiology since then, driven by thousands of amazing specimens from China plus new analytical methods. In 2010, we were among the first to develop a new analytical method to identify the colour of feathers, including the feathers of dinosaurs. Suddenly the ancient world came to life! Since then, the methods have been criticised, tested, and applied to many exceptional fossils of dinosaurs and birds, and the plumage colours and patterns reconstructed. These methods are scientific, meaning they can be tested (and so far they have withstood critical testing), and they make definite predictions about the colours of dinosaurs and other extinct animals. In a new collaboration, Mike Benton works with renowned palaeo-artist Bob Nicholls to bring to life 15 dinosaurs, birds and pterosaurs from all continents, and to show in detail how they looked in life. For the first time, we can believe what we see in the reconstruction, based on intimate study of skin, scales, and feathers of these ancient beasts. Mike and Bob's book 'Dinosaurs: New Visions of a Lost World' was published in November 2021 by Thames & Hudson.

BACKGROUND

Mike Benton was elected Fellow of the Royal Society in 2014 for his fundamental contributions to understanding the history of life, particularly biodiversity fluctuations through time. He is fascinated by the transformation of palaeobiology from a speculative subject to testable science and led one of these discoveries – how to determine the colour of dinosaurs, rated as one of the top scientific discoveries of the 2010s. He works with fossils and rocks to interpret ancient environments, especially around the end-Permian mass extinction, the greatest loss of life on Earth, some 250 million years ago. Mike also works with fossils to build evolutionary trees and use them to date major events and rates and patterns of evolution, so helping us understand why some groups of animals are more successful than others. He is currently working on the Triassic, the time during which life recovered from the end-Permian mass extinction and when modern ecosystems arose; this was a time of arms races between major groups, and dinosaurs won.

Time:
12:20am (GMT)

VIRTUAL LECTURE

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

SATURDAY 12TH FEBRUARY

'The key role of metals and geoscience in the transition to a low-carbon future'

ABSTRACT

TALK 4

Meeting the target of maximum 2 degrees global warming requires a transition away from a energy production that is dominated by hydrocarbons within the next 20-30 years. Such a rapid global change in energy production will translate into a significant increase in demand for resources that are needed to build the necessary infrastructure. Wind turbines, photovoltaic cells, geothermal energy, and electric vehicles all require a very wide array of metals and minerals, most of which are not at present available in sufficient amounts to meet the future demand. At the same time, the lead-in time from a discovery of an ore deposit to the opening of a producing mine is typically >15-20 years. Global metal ore exploration budgets have been lagging behind the c. 50% increase in metal prices since 2016. The increasing demand for metals combined with a shortage of reserves means that the exploration budgets and activities are going to have to see a very significant increase in the near future, and budgets have already seen a 35% jump in 2021. As experts in Earth systems, including ore deposits, geoscientists have various roles in both ores exploration and mining, offering an opportunity for a career that will be increasingly central in delivering the resources needed for the energy transition.



Dr Taija Torvela,
Ore Mineralisation
University of Leeds, (UK)

BACKGROUND

Taija finished her PhD in 2007 at Abo Akademi University, Finland, on the 4D evolution of a crustal-scale shear zone in a Precambrian basement. After her PhD, she worked briefly for Magnus Minerals, conducting exploration in Central Finland, and then for Posiva as a structural geologist. Posiva is the organisation which is responsible for the final deposition of spent nuclear fuel in Finland into a crystalline basement repository. In 2009, Taija went to University of Aberdeen for a two-year post-doctoral fellowship. There, she was involved in the development of the Virtual Seismic Atlas, and research projects on structural interpretation of seismic data. She was appointed lecturer in structural geology and 3D modelling at the University of Helsinki. In Helsinki, she continued with research projects related to deep orogenic processes, specifically synorogenic mid-crustal extension and orogenic collapse, and the usability of seismic reflection data in researching crustal structures. Taija moved to Leeds in 2012. Here, she continues to pursue both her fundamental and applied research interests in basement processes and deformation. Taija's major interest in applied sciences is how deformation processes at various scales affect ore mineralisations, and how we can utilise structural geology knowledge in minerals exploration to help secure metal resources for energy transition.

Time:
13:45 (GMT)

VIRTUAL LECTURE

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

SATURDAY 12TH FEBRUARY

'Landscapes below our feet: What we can learn about them from the music of the Earth'



Dr Paula Koelemeijer
Seismology, Royal Holloway
University of London, (UK)

ABSTRACT

TALK 5

Intriguing landscapes are present in the deep Earth, reflecting the complex processes at work since the formation of our planet. To image these landscapes, surface recordings of seismic waves generated by earthquakes are combined using techniques similar to those used in medical CT imaging. These images allow us to answer fundamental questions about Earth's interior, such as: How has the Earth evolved to its present-day state? Does the Earth's mantle behave like a boiling pan of water, driven purely by thermal variations, or is it more like a gigantic lava lamp, due to compositional variations? These questions are important as they inform us about dynamic processes within the Earth that are relevant to its habitability and help us to understand how the evolution of the Earth differs from other planets in our solar system. In this talk I will discuss some of the most intriguing landscapes that we find in the Earth's mantle. I will specifically focus on two continent-sized features on top of the core that look different from the rest of the mantle. These so-called "blobs" are so large that they may influence how the Earth loses heat over time. Despite being imaged consistently for decades, their nature remains debated: are they clusters of hot plumes or stable, compositionally distinct piles? I will detail how observations of the free oscillations or standing waves of the Earth help us to study these structures and unravel what they are.

BACKGROUND

Paula Koelemeijer is a seismologist, currently based at Royal Holloway University of London. In her research she uses seismic waves to understand the world around us, covering subjects ranging from the deep Earth to human and animal behaviour. Originally trained in geophysics in her native Utrecht (The Netherlands), Paula completed her PhD in Seismology at the University of Cambridge in 2014, analysing whole Earth vibrations to study our planet's deep interior. She held prestigious individual research fellowships at ETH Zurich and University College Oxford before starting her Royal Society University Research Fellowship in 2018. She is the recipient of the 2018 Doornbos Memorial Prize for her work on deep Earth structure and dynamics and was awarded the Philip Leverhulme Prize in 2021 for research excellence.

Time:
14:45 (GMT)



VIRTUAL LECTURE

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HERDMAN SYMPOSIUM 2022

'IMPACTS OF GEOSCIENCE'

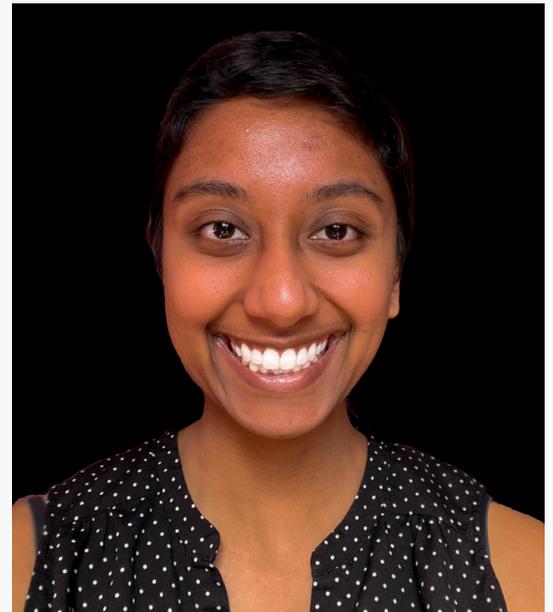
SATURDAY 12TH FEBRUARY

'Remote Sensing the Solar System in 3D'

ABSTRACT

TALK 6

This decade is an exciting one for space exploration, with new missions to land on Mars and the Moon probes of potential ocean worlds in the outer solar system. As these missions return more and more data, creative tools are useful for geologists to understand these alien worlds; 3D imaging is one such tool that bridges the field techniques of geologists on Earth with mapping remote terrains. Divya will discuss her work using 3D images to understand the surfaces and interiors of Mars and Saturn's icy satellites, as well as other exciting new ways planetary scientists are visualising other worlds.



Divya M. Persaud
Planetary Geophysics
NASA JPL, (USA)



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BACKGROUND

Divya M. Persaud is a planetary scientist, writer, and composer. With an ongoing focus in remote sensing for planetary geology and geophysics, Divya's research has involved developing new methods for remote sensing analysis, including adapting lidar data for Mercury surface geochemistry and using stereo topography to study the impact craters on and geophysics of Saturn's icy moons. She is currently pursuing her Ph.D. in Space & Climate Physics at UCL's Mullard Space Science Laboratory, where she is developing methods of 3D image processing, visualization, and analysis for Mars surface geology centred on Gale Crater, the exploration site of the Curiosity rover. She is also a postdoctoral scholar with the Europa Lander and Europa Clipper teams at the NASA Jet Propulsion Laboratory. She constitutes one half of the chamber-pop duo The Scientific Endeavour with Najia Khaled, with whom she is working on a debut album as cellist and songwriter. Her art incorporates her polymathic background and transcends form to discuss memory, human connection, and the double-diaspora experience. Divya hopes to be the first cellist on Mars.

Time:
15:55 (GMT)



VIRTUAL LECTURE

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THE LIVERPOOL GEOLOGICAL SOCIETY

On 13th December 1859 nine men met at 7 London Road, Liverpool, the home of George Highfield Moreton, a painter and decorator, and agreed to the formation of The Liverpool Geological Society. The objects of the Society were formulated “to investigate the structure of the Earth, the character of its past inhabitants, and the changes now in progress upon its surface” ... A Past President and Member, Professor Herdman and his wife endowed a Chair of Geology in The University of Liverpool in 1916 in memory of their son Lieutenant George Herdman who was killed in the First World War. With the opening of a Department of Geology in 1929, again due to Professor Herdman’s generosity in memory of his wife, Jane, many meetings were held in that building at the invitation of the first Professor PGH Boswell. Meetings continued to be held in The University of Liverpool’s Jane Herdman Laboratories of Geology, until latterly, ever increasing charges for overtime staff led to meetings being moved once again to Liverpool John Moores University’s Byrom Street Campus.

Today, after more than 150 years, the Society still flourishes, and is still composed overwhelmingly of ordinary people who have an interest in geology in all its many aspects – from volcanoes to floods, deserts and seas, mountains and glaciers, minerals and rocks, and fossils. Ever since the Society’s first open meeting, on 10th January 1860, The Liverpool Geological Society has invited the knowledgeable and famous to come and tell all those interested in the wonders of the world and its even more amazing history, beginning some 4,600,000,000 years ago.



**Hon. Secretary:
Maggie Williams**

**Email:
lgssecretary19@gmail.com**

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What we do

Our aim is to offer advice on the best, quickest and most cost effective methods for resolving your Environmental, Planning and Permitting Issues. We aim to develop long term relationships with our clients by listening to their requirements, doing a good job, often finding novel and economic methods, and charging a fair price for our work.

Who we work with

We work with many professional sectors including property development, construction, investment and divestment, industrial, manufacturing, engineering, planning, energy, architectural, hospitality, construction and demolition.

Where we are

Although based in Liverpool, we work throughout the UK and Ireland.

Why we are different

We take pride in what we do and how we can assist. We are always happy to talk and listen and give our opinion, or to provide a recommendation when we can't help. We get things done when others say no. A phase 1 desk top study for the morning, yes we can do it. Concrete Coring two day turnaround, yes it can be done. Asbestos issue, immediate response.

Contact:

If you would like to contact us please use the information below:

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UNIVERSITY OF
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NAMED CHARITIES



**Geology
for
Global
Development**

Geology for Global Development (GfGD) is a registered charity. Our purpose is to champion the role of geology in sustainable development, mobilising and reshaping the geology community to help deliver the UN Sustainable Development Goals (2015–2030).

Our Vision

WE SEE A WORLD WHERE:

- Every geologist is equipped with the skills and understanding required to make a positive contribution to sustainable development.
- The geology community is actively engaged in the design, implementation, monitoring, and evaluation of international development activities.
- Organisations, governments and individuals have equal access to, and an understanding of, the geological science required to ensure sustainable development.

INSPIRATION. EDUCATION. ACTION. LEADERSHIP



Diversity in Geoscience

theiagd.org/dig-uk

Diversity in Geoscience UK (DiG-UK) is the newly-established UK chapter of the IAGD. The IAGD is now an Associated Society of the Geological Society of London, and DiG-UK aims to expand the mission and vision of the IAGD while focusing specifically on the needs, values and resources in the UK. Within this context, DiG-UK will undertake to broaden its responsibility beyond disability to cover wider aspects of diversity including, but not restricted to, gender, race and ethnicity, sexuality and social class.

DiG-UK is co-lead by Dr Jacqueline Houghton (University of Leeds) and Dr Alison Stokes (University of Plymouth). Jacqui and Alison are active members of the IAGD community and Executive Committee, and members of the Committee of the Geological Society of London Higher Education Network. Alison is also a member of the Committee of Heads of Environmental Sciences, where she holds the portfolio for diversity and inclusivity.

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