

**ASCAC Subcommittee on:
'AI/ML, Data-intensive Science and
High-Performance Computing'**

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ASCAC Subcommittee on: 'AI/ML, Data-intensive Science and High-Performance Computing'

Use shorthand: Subcommittee on 'AI for Science'

The Charge Letter:

- The letter sets the context of the challenge to the subcommittee:
 - Artificial Intelligence and Machine Learning (AI/ML) have the potential for providing new insights and even new discoveries from this data, including the correlation of experimental and computational data.
 - However, the technical aspects of "AI/ML for Science" may be more challenging than currently envisioned. Over the last few years, several workshops and subcommittee reports have identified and enumerated the scientific opportunities and some challenges from the intersection of AI/ML with data-intensive science and high performance computing.
- The letter requires the sub-committee deliver a report that:
 - Assesses the opportunities and challenges from Artificial Intelligence and Machine Learning for the advancement of science, technology, and Office of Science missions.
 - Identifies strategies that ASCR can use, in coordination with the other SC programs, to address the challenges and deliver on the opportunities.
 - Notes that, due to the cross-cutting nature of this effort, in assembling this subcommittee, we need to include members of, and recommendations from the other Office of Science Federal Advisory Committees, as well as Industry and other Federal experts.

Membership of the Subcommittee

ASCAC Members – Tony Hey, Jack Dongarra

AITO – Fred Streit

HPC, AI and Big Data academic members:

- Phil Bourne (Virginia)
- Geoffrey Fox (Indiana)
- Ewa Deelman (USC)
- Joel Saltz (Stony Brook)
- Dan Stanzione (TACC)
- Rebecca Willett (Chicago)

Representatives from other Office of Science Advisory Committees:

- HEPAP – Mike Hildreth (Notre Dame)
- BERAC – Kerstin Kleese van Dam (BNL)
- BESAC – Abbas Ourmazd (Wisconsin)
- NSAC – Tanja Horn (Catholic University)
- FESAC – Phil Snyder (General Atomics)

NSB – Anneila Sargent (Caltech)

Planned initial information gathering

'AI for Science' Town Hall presentations:

- Rick Stevens (ANL)
- Kathy Yelick (LBNL)
- Jeff Nichols (ORNL)

Presentations/submissions from Office of Science programs

- HEPAP – Mike Hildreth (Notre Dame)
- BERAC – Kerstin Kleese van Dam (BNL)
- BESAC – Abbas Ourmazd (Wisconsin)
- NSAC – Tanja Horn (Catholic University)
- FESAC – Phil Snyder (General Atomics)

Other Agency presentations/submissions:

- NSF - Manish Parashar (OAC), Denise Caldwell (MPS/PHY)
- NIH – Susan Gregurick (ASCAC), Grace Peng (NIBIB)

Industrial presentations

From the IT industry (software):

- Amazon
- Google
- IBM
- Microsoft
- Facebook

From the IT industry (hardware):

- Cerebras
- Intel

From non-IT industry:

- GSK
- GE

AI for Science: Subcommittee Meetings

Information briefings

- First meeting – F2F in Washington DC February 26th – 27th
- Three Zoom meetings:
 - March 13th
 - March 27th
 - April 10th

Discussion of preliminary conclusions and recommendations

- April 30th – May 1st (via Zoom)
- Follow-up meetings TBD

Agenda for February 26th – 27th Meeting

26th February

Presentations from IT companies:

- Amazon – Sanjay Padhi
- Facebook – Larry Zitnik by Zoom
- Google - Peter Norvig by Zoom
- IBM - Jed Pitera
- Microsoft – Sarah Bird by Zoom

Other Agency Presentations:

NIH Presentations

- NIH – Susan Gregurick
- NIBIB - Grace Peng

NSF Presentations

- OAC – Manish Parashar
- MPS/PHY - Denise Caldwell

26th February (continued)

Other presentations

- ASCR-BES CAMERA Project – Jamie Sethian (LBNL)
- ASA Statistics presentation – Laura Freeman (Virginia Tech)
- UQ DOE/NIH AI presentation – Tanmoy Bhattacharya (LANL)

27th February

Review of ‘AI for Science’ Town Halls

- Rick Stevens, Valerie Taylor, Ian Foster – ANL
- Kathy Yelick and Jonathan Carter – LBNL
- Jeff Nichols and Barney Maccabe – ORNL

Closed session

- Subcommittee discussion and agreed actions

Zoom Meetings in March and April

Friday March 13th

- AI at ORNL – David Womble
- Report from BERAC – Kerstin Kleese van Dam
- Report from FESAC – Phil Snyder
- Report from HEPAP – Mike Hildreth

Friday March 27th

- Report from NSAC – Tanja Horn
- Report from BESAC – Abbas Ourmazd
- AI in GSK – Kim Branson
- AI in GE – Rick Arthur

Friday April 10th

- AI for Science - Becca Willett (U Chicago)
- AI for Science – Pedro Domingos (U Washington)
- Cerebras – Andy Hock
- Intel – Raja Koduri

Collection of US Reports on AI

Office of Science Reports

- AI for Science – Report from Town Hall meetings (January 2020)
- Basic Research Needs for Scientific Machine Learning (September 2019)
- FES ASCR Machine Learning Report (September 2019)
- Data and Models: Framework for AI in Science - SC Roundtable (June 2019)

National Reports

- American AI Initiative One Year Annual Progress Report (February 2020)
- Draft NOAA AI Strategy (November 2019)
- NSCAI Interim Report to Congress (November 2019)
- Summary of White House 2019 Summit on AI in Government (September 2019)
- Presidential EO on AI (February 2019)
- NIH Strategic Plan for Data Science
- AI R&D Progress Report 2016 – 2019) – Inter Agency Working Group
- Summary of 2018 White House Summit on AI for Industry
- Summary of 2018 DOD AI strategy
- Summary of White House 2018
- NSTC national AI R&D Strategic Plan (2016)
- **Research Community Reports**
 - ML in the HEP Community – White Paper (May 2019)

Charge Letter Timetable

‘We would appreciate the committee's preliminary comments by May 2020 and a final report by August 2020.’

Suggested schedule:

- February 26/27 2020 – Input briefings and initial discussion (Washington DC)
- March 2020 – Further sub-committee meetings to prepare outline structure of report plus allocation of responsibilities
- April 2020 – Discussions of first draft of subcommittee report
- May 2020 – Preliminary version of report delivered to ASCAC for comments
- June/July 2020 – Revisions of draft report
- August 2020 – Final version of report delivered to ASCAC and Office of Science