

Mengli Zhang

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SUMMARY

Research: Science & Innovations

- Pioneer in understanding geologic hydrogen systems and in natural and stimulated hydrogen exploration and production using integrated geophysical approaches
- Original developer of ergodic sampling theory, the application of which can achieve up to 10× reductions in acquisition time and cost without loss of information content
- Research portfolio spanning critical mineral & energy exploration, geologic hydrogen systems, carbon storage monitoring, infrastructure geophysics, and efficient survey design
- Geophysical expertise in magnetotellurics (MT), magnetics, gravity, induced polarization (IP), electromagnetics (EM), seismic, rock physics, well logging, multi-physics integration
- Core methodologies include ergodic sampling (PhD dissertation; original developer), compressive sensing, geophysical inversion, and machine learning

Expertise & Funding Highlights

- 10 years of industry experience and 8 years of academic research experience, spanning exploration, development, and advanced geophysical R&D
- Led the full lifecycle of multi-geophysical field campaigns, from planning and permitting to deployment, processing, and interpretation
- Guided 500+ well placements and conducted post-drilling and production-stage analyses, integrating economic objectives to improve targeting and reduce exploration risk
- Raised \$4.5M in competitive funding for geologic hydrogen and critical mineral research; secured million-level industry funding for next-stage programs

Leadership & Management

- Director of a research Center comprised of 3 faculty, 3 post-doctoral researchers, and 7 students, providing strategic direction, mentorship, program management and execution
- Leads an industry consortium, expanded sponsorship from 5 to 11 members, and co-founded a new consortium by growing it from inception to 6 sponsors
- Organizer of international workshops in critical minerals & energy systems
- Built and sustained a global professional network of 80+ institutions, spanning federal and state agencies, universities, industry, international organizations, policy think tanks, and professional societies.
- Former Regional Chief Geophysicist at a major energy company, overseeing 15 exploration and development projects and driving improvements in interpretation and targeting methodologies through integration of drilling outcomes, production data, and R&D-driven geophysical innovations

EDUCATION

2021 - 2022: PhD in Geophysics, Colorado School of Mines, USA

Dissertation: Ergodic sampling: Efficient and economical geophysical data acquisition design

2017 - 2020: MS in Geosciences, The University of Texas at Dallas, USA

2004 - 2007: MS in Information and Communication System, Xi'an Jiaotong University, China

Thesis: Wavelet construction and its application in seismic signal analysis

2000 - 2004: BS in Information Engineering, Xi'an Jiaotong University, China

Thesis: Slepian wavelet and its spectrum analysis

EMPLOYMENT

2026 August – present: Assistant Professor, University of Georgia, USA

2026 April - 2026 August: Research Associate Professor, Colorado School of Mines, USA

- 2025- present: Director of Center for Geophysics, Energy, and Minerals (CGEM) (formerly Center for Gravity, Electrical, and Magnetic Studies)

2023 - 2026: Research Assistant Professor, Colorado School of Mines, USA

- 2022-present: PI, Geo-Multiphysics Research Consortium (GMRC)
- 2022-2025: Co-Director of Center for Gravity, Electrical, and Magnetic Studies (CGEM)
- 2023-2025: Co-PI, Geologic H₂ Exploration Consortium
- 2024-present: PI, Stimulated H₂ project funded by ARPA-E of Department of Energy
- 2023-present: PI, EM CCS monitoring project funded by NETL of Department of Energy
- 2024-2025: PI for geologic H₂ project funded by Grantham Foundation

2022 - 2023: Research Associate, Colorado School of Mines, USA

- 2022-2025 Co-PI of Geo-Multiphysics Research Consortium (GMRC)
- 2023-2025 Co-PI of Geologic H₂ Exploration
- 2022-2023 PI for infrastructure geophysics project funded by Virginia Department of Transportation

2007 - 2017 Geophysicist, China National Petroleum Corporation, China

RESEARCH and FUNDING (Raised \$4.5M)

- 2024-2027: PI of Geo-Multiphysics Research Consortium (GMRC)
- 2023-2025: Co-PI of H₂ exploration consortium: Joint USGS-Mines H₂ Exploration Project at Mines (part of an NSF/IUCRC)
- 2024-2026 PI: Geophysical characterization and site-scale real-time monitoring in stimulated hydrogen, ARPA-E of DOE, in collaboration with USGS, CU Boulder, Lawrence Berkley National Laboratory (LBNL), California Geological Survey (CGS), GE Aerospace)
- 2023-2025: PI, NETL project: Kemper EM survey data processing and assessment for

carbon storage

- 2022-2023: PI: Delineating buried pipes using magnetic data from ergodic borehole acquisition, Virginia Department of Transportation
- 2024-2026: PI, ARPA-E project: Baseline survey for multi-geophysical monitoring at a potential site for stimulated geologic hydrogen in Oman
- 2024-2026: PI, ARPA-E project: Rapid Screening of Natural Hydrogen Seeps for Geologic Hydrogen Exploration
- 2024-2025: PI, Grantham Foundation, Geophysics on geologic H₂ exploration

TEACHING

- Undergraduate course GPGN404 *Digital signal processing*, 2024, Colorado School of Mines
- Graduate course GPGN598 *Compressive sensing in applied geosciences*, 2023, Colorado School of Mines
- Graduate Course GPGN598A *Geophysics for mineral exploration*, 2023, Colorado School of Mine (co-instructor)
- Graduate Course GPGN598A *Geophysics for mineral exploration*, 2024, Colorado School of Mine (co-instructor)

PUBLICATIONS

Book Chapter

1. **Mengli Zhang**, Yaoguo Li, 2024, The challenges of energy transition and opportunities for geophysicists, Chapter 18 in *Geophysics and the Energy Transition* (Ed. Wilson, Davis, and Landrø), Elsevier

Peer-reviewed papers (21)

1. Noah Perkocich*, **Mengli Zhang**; Colton Kohnke; Richard Hammack; Yaoguo Li, 2026, Feasibility Assessment of Semi-Airborne CSEM Monitoring for CO₂ Storage in Saline Aquifers: a Kemper CarbonSAFE Field Study, *International Journal of Greenhouse Gas Control*, accepted
2. **Mengli Zhang**, Yaoguo, Li, 2026, High-resolution airborne geophysical data acquisition using ergodic sampling, *Journal of Applied Geophysics*, <https://www.sciencedirect.com/science/article/pii/S0926985126001436>
3. **Mengli Zhang**, Yaoguo Li, 2026, Finding natural H₂ generation zones in Midcontinent Rift in the U.S. by identifying the geophysical signatures of a serpentinization system, *Scientific Reports*, <https://www.nature.com/articles/s41598-025-33438-0>
4. Biruk Cherkose*, **Mengli Zhang**, Yaoguo Li, 2026, Finding geologic hydrogen generation in UAE ophiolites: insights from MT phase tensor mapping of

- serpentinization, *Discover Applied Sciences*, Volume 8, number 460, <https://link.springer.com/article/10.1007/s42452-026-08490-8>
5. Biruk Cherkose*, **Mengli Zhang**, Yaoguo Li, 2026, Detecting Serpentinization Related Electrical Anisotropy Using Magnetotelluric Phase Tensors: Application in Geologic Hydrogen Exploration, *Journal of Geophysics and Engineering*, <https://academic.oup.com/jge/advance-article/doi/10.1093/jge/gxag023/8442231>
 6. Xiaozhong Tong, Wei Xie, **Mengli Zhang**, 2026, Fast 3D large-scale forward modeling of vector and tensor magnetic fields using FFT-based spectral method, *Geophysical Prospecting*, <https://onlinelibrary.wiley.com/doi/10.1111/1365-2478.70127>
 7. **Mengli Zhang**, Eric Battig, Yaoguo Li, 2025, First field trial of an airborne magnetic survey using ergodic sampling, *The Leading Edge*, volume 44, issue 11, <https://pubs.geoscienceworld.org/seg/tle/article/44/11/831/669269/First-field-trial-of-ergodic-sampling-for-airborne>
 8. Mengli Zhang, Noah Perkovich*, Yaoguo Li, Jessica Weihermann*, and R. Nate Crummett*, 2025, A Geophysical Investigation of the Fairy Circles in Nebraska for Geologic Hydrogen Exploration, *Scientific Reports*, <https://doi.org/10.1038/s41598-025-07335-5>
 9. Yaoguo Li, **Mengli Zhang**, 2025, Geologic hydrogen exploration by imaging key hydrogen system components using multiple geophysical methods, *Journal of Geophysics and Engineering*, <https://doi.org/10.1093/jge/gxaf047>
 10. Hyoungea Rim, **Mengli Zhang**, Yaoguo Li, 2025, Magnetic and magnetic gradient fields due to a finite line segment, *Journal of Applied Geophysics*, <https://doi.org/10.1016/j.jappgeo.2025.105682>
 11. **Mengli Zhang**, Yaoguo Li, 2024, The role of geophysics in geologic hydrogen resources, *Journal of Geophysics and Engineering*, 21(4), 1242-1253, <https://doi.org/10.1093/jge/gxae056>
 12. **Mengli Zhang**, Yaoguo Li, 2024, Ergodic sampling: A new data acquisition method to save cost and gather more information, *Geophysical Prospecting*, (published online 2023), <https://onlinelibrary.wiley.com/doi/10.1111/1365-2478.13419>
 13. **Mengli Zhang**, Yaoguo Li, 2023, Efficient magnetotelluric data acquisition using irregular stations and compressive sensing reconstruction, *Journal of Applied Geophysics*, Volume 217, p105-169, <https://doi.org/10.1016/j.jappgeo.2023.105169>
 14. **Mengli Zhang**, 2023, Efficient 3D seismic acquisition design using compressive sensing principles, *Journal of Seismic Exploration*, Volume 32, No. 5, <https://www.geophysicalpress.com/journal/JSE/articles/21>
 15. **Mengli Zhang**, 2022, Compressive sensing acquisition with application to Marchenko imaging, *Pure and Applied Geophysics*, Volume 179, p2383–2404, <https://doi.org/10.1007/s00024-022-03029-5>

16. **Mengli Zhang**, David Lumley, 2021, Time-lapse seismic data reconstruction using compressive sensing, *Geophysics*, 86(5), 37-48, <https://doi.org/10.1190/geo2020-0746.1>
17. Yutan Dou, Huaqing. Liu Menggang Zhang and **Mengli Zhang**, 2018, Key technologies of tight gas reservoir prediction controlled by time-equivalent geological horizons: *Journal of Mines, Metals and Fuels*, Volume 66 No.1, <https://doi.org/10.18311/jmmf/2018/27972>
18. Qilin Chen, Yutan Dou, Mingjun Su, Huaqing Liu, **Mengli Zhang**, 2018, Discussion on lithology data conversion methods in studies of seismic sedimentology, *Journal of Mines, Metals and Fuels*: Volume 66, Issue 2, <https://doi.org/10.18311/jmmf/2018/28291>
19. Hua Yang, Wang Daxing, Mengbo Zhang and **Mengli Zhang**, 2017, Seismic prediction method of pore fluid in tight gas reservoirs, Ordos basin, NW China: *Petroleum Exploration and Development*, Volume 44, p544-551, [https://doi.org/10.1016/S1876-3804\(17\)30063-0](https://doi.org/10.1016/S1876-3804(17)30063-0)
20. Yutan Dou, Daxing Wang and **Mengli Zhang**, 2017, Lithology prediction and pore fluid detection of tight sandstone reservoir: *Journal of Mines, Metals and Fuels*, Volume 65 No.3, <https://doi.org/10.18311/jmmf/2017/27028>
21. Jing Zhao, Jinghuai Gao, Daxing Wang, **Mengli Zhang**, 2014, Q-factor and velocity inversion from zero-offset VSP data: *Journal of Applied Geophysics*, Volume 101, p51-67, <https://doi.org/10.1016/j.jappgeo.2013.11.005>

PhD dissertation

1. Mengli Zhang, *Ergodic Sampling: Efficient and Economical Geophysical Data Acquisition Design*, Colorado School of Mines, 2022

Expanded abstracts (4 pages) with presentations

1. **Mengli Zhang**, Biruk Abera Cherkose, and Yaoguo Li, Predicting potential geologic hydrogen reservoir locations using MT and seismic data, *International Meeting for Applied Geoscience & Energy*, Expanded Abstract, Houston, 2025
2. Biruk Abera Cherkose, **Mengli Zhang** and Yaoguo Li, A geologic hydrogen investigation using magnetotelluric phase tensors: Case study from the UAE Ophiolite blocks, *International Meeting for Applied Geoscience & Energy*, Expanded Abstract, Houston, 2025
3. **Mengli Zhang**, Yaoguo Li, 2024, Geophysics in gold hydrogen exploration, *International Meeting for Applied Geoscience & Energy*, Expanded Abstract, Houston, 2024
4. Yaoguo Li, **Mengli Zhang**, 2024, Geologic hydrogen: An emerging role of mining geophysics in new energy exploration, *International Meeting for Applied Geoscience & Energy*, Expanded Abstract, Houston, 2024

5. **Mengli Zhang**, Yaoguo Li, 2024, Geologic hydrogen exploration and the influence of reservoir diffusive zone, 18th Southern Africa Geophysical Association (SAGA) Biennial Conference & Exhibition, Namibia 2024
6. **Mengli Zhang**, 2024, Ergodic geophysical survey design to improve resolution with fixed budget, Advances in Geophysical Solutions for Complex Geological Settings in Kuala Lumpur, Society of Exploration Geophysicists (SEG), Malaysia
7. **Mengli Zhang**, Yaoguo Li, 2024, Ergodic geophysical survey design and its application in exploration decision making, *International Workshop on Gravity, Electrical, and Magnetic Methods and Their Applications*, GEM 2024, China, 2024, p323-326
8. **Mengli Zhang**, Yaoguo Li, 2023, Airborne data acquisition using ergodic sampling: A new design criterion, international conference on Engineering Geophysics (ICEG), 2023, Al Ain, UAE
9. **Mengli Zhang**, Yaoguo Li, 2023, Ergodic sampling: A new data acquisition method to gather more information, International Meeting for Applied Geoscience & Energy, Expanded Abstract, Houston, 2023
10. **Mengli Zhang**, Yaoguo Li, 2023, Computational Geophysical Acquisition (CGA) as an enabler of geophysical solutions, invited talk for the future of Geophysics, International Meeting for Applied Geoscience & Energy, Expanded Abstract, Houston, 2023
11. Hyoungrea Rim, **Mengli Zhang**, Yaoguo Li, 2023, Delineating buried metallic pipes using borehole magnetic data in civil engineering, International Meeting for Applied Geoscience & Energy, Expanded Abstract, Houston, 2023
12. **Mengli Zhang**, Yaoguo Li, 2022, Irregular acquisition design to maximize information: From cross-lines to ergodic sampling, IMAGE 22 annual meeting, Houston, 2022
13. **Mengli Zhang**, Yaoguo Li, 2021, Efficient ground EM acquisition using irregular sparse stations: A compressive sensing approach, International Meeting for Applied Geoscience & Energy, Expanded Abstract, 1241-1245
14. **Mengli Zhang**, 2020, Marchenko Green's function by using compressive sensing acquisition, SEG Technical Program Expanded Abstracts 2020
15. **Mengli Zhang**, David Lumley, 2019, Reconstruction of 3D seismic data from sparse random OBN acquisition by compressive sensing, SEG Technical Program Expanded Abstracts 2019, 127-130
16. **Mengli Zhang**, Wang Daxing, Zhao Yuhua, Man Weishi, 2017, Reservoir Prediction Based on Synchrosqueezed Wavelet Transform: International Geophysical Conference, Qingdao, China, 256-259
17. **Mengli Zhang**, Man Weishi, Wang Daxing, Zhao Yuhua, Du Guanghong, 2016, Seismic Sedimentary Analysis of the Tight Reservoir based on TT Transform: SEG Technical Program Expanded Abstracts 2016: 1924-1928

18. Juan Chen, Yuhua Zhao, Daxing Wang, Deyong Zhao and **Mengli Zhang**, 2016, Application of a 3D Seismic Static Correction Method in Complex Loess Plateau Area: SPG/SEG 2016 International Geophysical Conference, Beijing, China, 257-260
19. Wang Daxing, Zhang Mengbo, **Mengli Zhang**, Cai Kehan, 2014, Seismic Prediction Technology of Middle Gas Formation of Ordovician Dolomite in Loess Plateau of Shaanxi Province: Beijing 2014 International Geophysical Conference & Exposition, Beijing, China, 902-905
20. Jing Zhao, Jinghuai Gao, Da Xing Wang and **Mengli Zhang**, 2011, Estimation of quality factor Q from pre-stack CMP records using EPIFVO analysis: SEG Technical Program Expanded Abstracts 2011: 1835-1839
21. Wang Daxing, Zhang Mengbo, **Mengli Zhang**, 2009, Application of pre-stack elastic parameters crossplot technology in gas-bearing reservoir prediction: Beijing 2009 International Geophysical Conference and Exposition, Beijing, China, 56-56
22. Man Weishi, Gao Jinghuai, **Mengli Zhang**, Bao Qianzong, Wang Wei, 2006, The stochastic noise attenuation in VSP: SEG Technical Program Expanded Abstracts 2006: 3516-3520

Conference presentations (with short abstracts)

1. **Mengli Zhang**, Yaoguo Li, New framework of ranking hydrogen generation potential in igneous rocks, International Meeting for Applied Geoscience & Energy, Expanded Abstract, Houston, 2026
2. Joseph Capriotti, Noah Perkovich, **Mengli Zhang**, Yaoguo Li, Geophysical responses of stimulated hydrogen production in ultramafic rocks, International Meeting for Applied Geoscience & Energy, Houston, 2025
3. Evan Um, David Alumbaugh, **Mengli Zhang**, Joseph Capriotti, Noah Perkovich, and Yaoguo Li, Crosswell Electromagnetic Method for Monitoring Serpentinization During Geological Hydrogen Production, International Meeting for Applied Geoscience & Energy, Houston, 2025
4. Noah Perkovich, **Mengli Zhang**, Colton Kohnke, Richard Hammack, and Yaoguo Li, 3D Inversion of Semi-airborne CSEM Data at the Kemper CarbonSAFE Site in Mississippi, International Meeting for Applied Geoscience & Energy, Houston, 2025
5. Jessica D. Weihermann, Yaoguo Li, **Mengli Zhang**, Machine Learning-based Normalization of Thorium in Airborne Gamma-Ray Spectrometry for Improved Anomaly Detection, International Meeting for Applied Geoscience & Energy, Houston, 2025
6. Noah Perkovich, **Mengli Zhang**, Yaoguo Li, Electrical imaging beneath a fairy circle for geologic hydrogen investigation, International Meeting for Applied Geoscience & Energy, Houston, 2025

7. **Mengli Zhang**, Brendan Howe, Sarah Devriese, 2025, A field trial of airborne gravity gradiometry and magnetic survey using ergodic sampling, International Meeting for Applied Geoscience & Energy, Houston, 2025
8. **Mengli Zhang**, Low-cost and high-resolution geophysical data acquisition using ergodic survey design, 6th Edition of world Congress on Geology & Earth Science, Berlin, Germany, 2025
9. **Mengli Zhang**, Noah Perkovich, Yaoguo Li and Jessica Weihermann, A geophysics investigation in geologic hydrogen: Connecting surface features with subsurface structures, AGU Fall Meeting 2024
10. Colton Kohnke, Noah Perkovich, **Mengli Zhang**, Yaoguo Li, Richard Hammack, 2024, Electromagnetics for Monitoring the Kemper CarbonSAFE Site: Baseline Conductivity Model Recovery, AGU Fall Meeting 2024
11. **Mengli Zhang**, Eric Battig, Yaoguo Li, 2024, First field trial of an airborne magnetic survey using ergodic sampling, International Meeting for Applied Geoscience & Energy, Houston, 2024
12. Mohammed K. Alnabbat, Brett Bernstein, **Mengli Zhang**, 2024, Reconstructing high-resolution 2D data from low-resolution inputs using a super-resolution conditional generative adversarial network, International Meeting for Applied Geoscience & Energy, Houston, 2024
13. **Mengli Zhang**, Yaoguo Li, 2023, Geologic H₂ Resource Exploration using Geophysics, AGU Fall Meeting 2023
14. **Mengli Zhang**, Yaoguo Li, 2022, Ergodic sampling: A new data acquisition method to save cost and gather more information, AGU Fall Meeting 2022
15. **Mengli Zhang**, Yaoguo Li, Geoffrey S. Ellis, 2022, Geological hydrogen exploration: Roles of integrated geophysics, GSA Connect 2022 meeting in Denver, Colorado
16. **Mengli Zhang**, Yaoguo Li, 2021, Efficient irregular sparse MT ground acquisition: A study using AusLAMP MT data from Australia, AGU Fall Meeting 2021
17. **Mengli Zhang**, David Lumley, Hejun Zhu, 2019, Broadband seismic survey design by compressive sensing: A study using USArray Transportable Array data, AGU Fall Meeting 2019

Selected INVITED PRESENTATIONS

Invitation institutions cover federal and state agencies, universities, industries, international organizations, policy think tanks, professional societies, major conferences.

1. **Mengli Zhang**, 2026, Diffusive zone in geologic hydrogen reservoir and its influence on geophysical exploration strategies, Gordon Research Conference, June 2026, Newry,

Maine

2. **Mengli Zhang**, 2026, From Fairy Circles to Subsurface Reservoirs: Geophysical Exploration of Geologic Hydrogen, K. Douglas Nelson Lecture Series, April 2026, Syracuse University, Syracuse, NY
3. **Mengli Zhang**, 2026, Geologic Hydrogen: A New Global Energy Source, panelist, ARPA-E Energy Innovation Summit, April 2026, San Diego
4. **Mengli Zhang**, 2026, Natural Hydrogen Beneath Our Feet: Detection, Formation, and Energy Potential, April 2026, Colorado State University, Fort Colin
5. **Mengli Zhang**, 2026, Geologic Hydrogen Exploration and Its Resource Potential in Iowa, University of Iowa, February 2026, Iowa city
6. **Mengli Zhang**, 2026, Geologic Hydrogen Potential in Iowa State, Invited talk and panelist on Legislative Agriculture Chairs Summit by State Agriculture and Rural Leaders, scheduled for January 2026, New Orleans
7. **Mengli Zhang**, 2025, Geologic Hydrogen as a primary resource, Third Annual National Hydrogen Policy Leaders Convention, United States Hydrogen Alliance, September 2025, Denver
8. **Mengli Zhang**, 2025, Frontiers in Geologic Hydrogen, National Academies of Sciences, Engineering, Medicine.
9. **Mengli Zhang**, 2025, Exploring the future of geologic hydrogen: Defining the Path Ahead, Energy Futures Initiative (EFI) foundation, DC
10. **Mengli Zhang**, 2025, Confluence of surface and subsurface exploration in application of geologic H₂ exploration, Natural hydrogen exploration workshop by National Office of Hydrocarbons and Mines (ONHYM) and University Mohammed VI Polytechnic (UM6P) in Morocco
11. Yaoguo Li and **Mengli Zhang**, 2025, Geologic hydrogen and an emerging role of mining geophysics, BC Geophysical Society, Canada
12. **Mengli Zhang**, 2024, A geophysics investigation in geologic hydrogen: Connecting surface features with subsurface structures, AGU Fall Meeting, DC, US
13. **Mengli Zhang**, 2024, Geologic hydrogen as a significant part of solution portfolio for energy transition: Current state of the discipline and Mines world-leading position, Heiland Lecture, Colorado School of Mines
14. **Mengli Zhang**, 2024, The impact of industry-driven consortium on geologic H₂ research and potential contribution to Alaska through geophysical exploration, Geologic H₂ workshop, the US Arctic Research Commission and the University of Alaska Fairbanks Geophysical Institute, Alaska
15. **Mengli Zhang**, 2024, Mitigate false positive and false negative geophysical results in geologic hydrogen exploration, Natural Hydrogen Association of Australia's inaugural conference, Australia

16. **Mengli Zhang**, 2024, Geologic hydrogen exploration and the influence of reservoir diffusive zone, 18th Southern Africa Geophysical Association (SAGA) Biennial Conference & Exhibition, Namibia
17. **Mengli Zhang**, 2024, Ergodic geophysical survey design to improve resolution with fixed budget, Advances in Geophysical Solutions for Complex Geological Settings in Kuala Lumpur, Society of Exploration Geophysicists (SEG), Malaysia
18. **Mengli Zhang**, 2024, AAAS annual meeting in Denver, Science breakthrough session: the hunt for geologic Hydrogen heats up, Denver, AAAS
19. **Mengli Zhang**, 2024, Ergodic sampling and application to airborne geophysical data acquisition, Denver, USGS
20. **Mengli Zhang**, 2023, Geophysics in gold H₂ exploration, CSIRO Cutting Edge Science Symposium, Australia's National Science Agency, Perth, Western Australia