Ice Drilling Program

IDP Update

Mary R. Albert, PhD
IDP Executive Director

IDP-SAB meeting
March 17, 2021

www.Icedrill.org

Ice Drilling Program
Vision and Mission

Vision

To enable discoveries about changes in climate and the environment, using evidence from glaciers and ice sheets, to inform environmental policy.

Mission

To conduct integrated planning for the ice drilling science and technology communities **and to provide drilling technology and operational support** that will enable the community to advance the frontiers of climate and environmental science.

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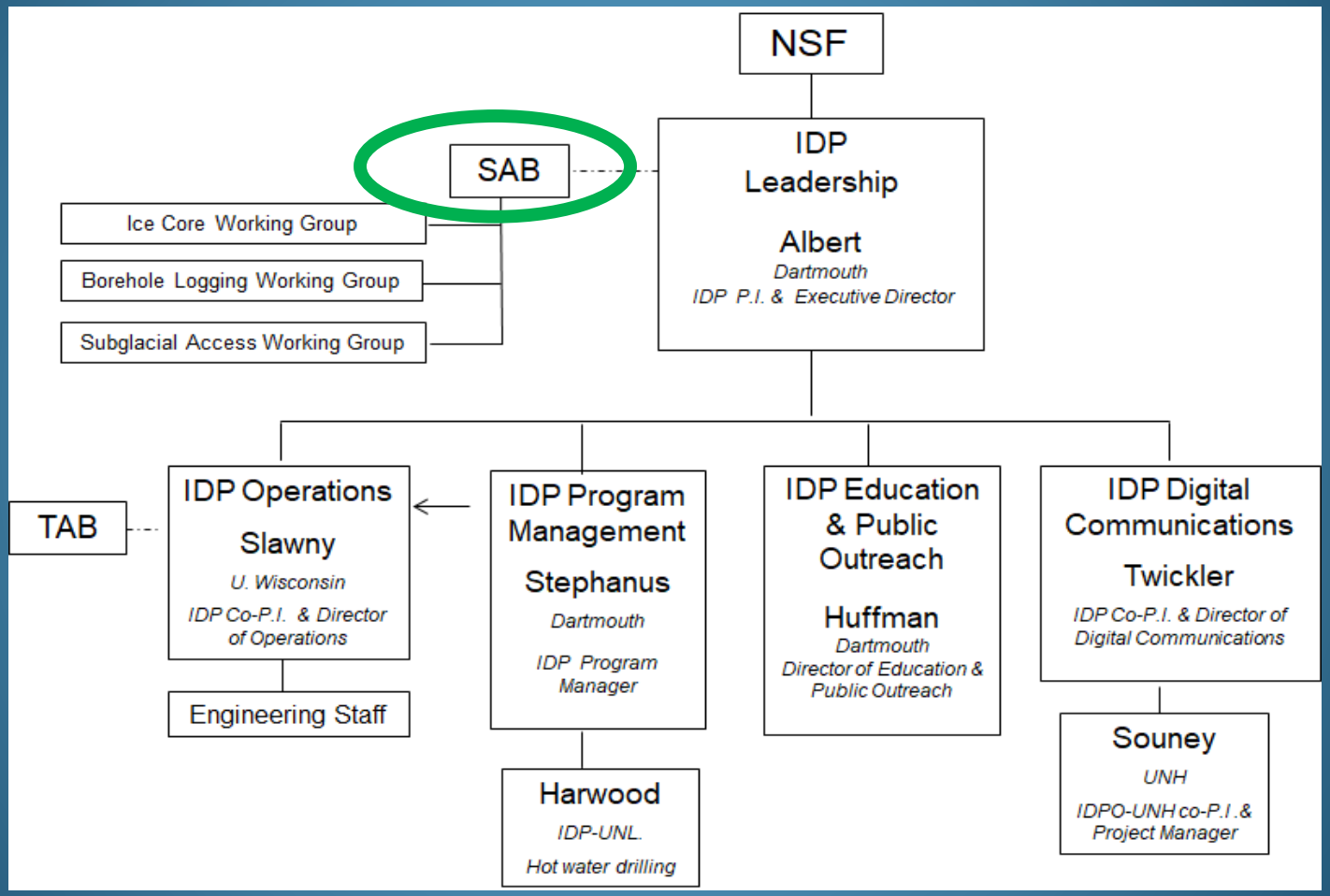
Ice Drilling Program



Ice Drilling Program
Planning with the Community

AGU Town Hall: Scientific Drilling in the Polar Regions

December 16, 2020

Updates & announcements of opportunities from IDP, IPICS, Herc Dome, GreenDrill, RAID

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Ice Drilling Program
Planning with the Community

IDP Ice Core Working Group Community Meeting

April 2-3, 2020

ICWG leads: Erich Osterberg & T.J. Fudge

Outcome: 4 community white papers on ice core science over the coming decade, for synthesis into the IDP Long Range Science Plan 2020-2030

https://icedrill.org/about/science-advisory-board/working-groups#icwg

Ice Drilling Program
Planning with the Community

IDP ICWG Community Meeting White Papers 2020

- Paolo Gabrielli and others (2020): **Alpine Glaciers and Ice Caps**
- Tyler R Jones and others (2020): **Paleoclimate Ice Core Research Priorities in Antarctica**
- Erich Osterberg and others (2020): **Ice Core Research Priorities in Greenland**
- TJ Fudge and others (2020): **Community Recommendations for the NSF Ice Core Facility**

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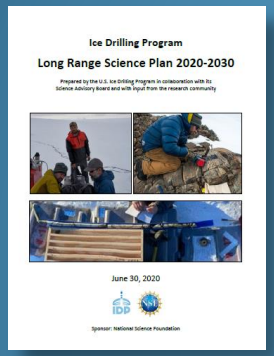
Ice Drilling Program
Planning with the Community

IDP Long Range Science Plan



- Past Climate
- Ice Dynamics and Glacial History
- Subglacial Geology, Sediments & Ecosystems
- Ice as a Scientific Observatory

- The Long Range Science Plan is a community document articulating the direction of the science over the coming decade.
- The IDP-SAB approves the plan & prioritizes tech investments.

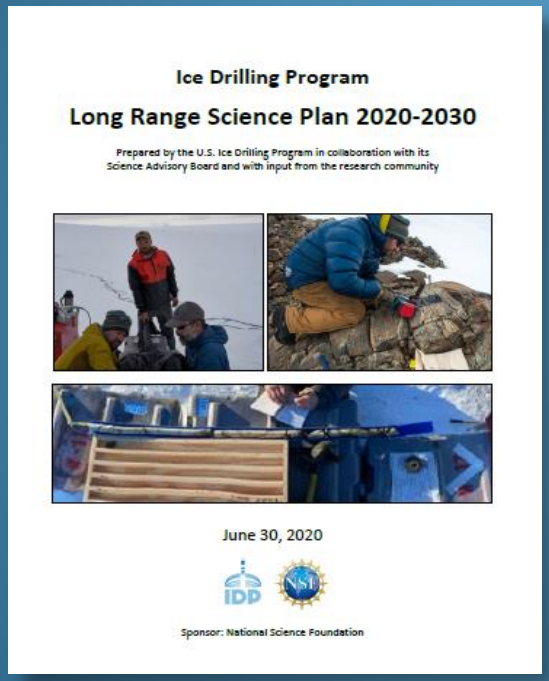
Timeline:

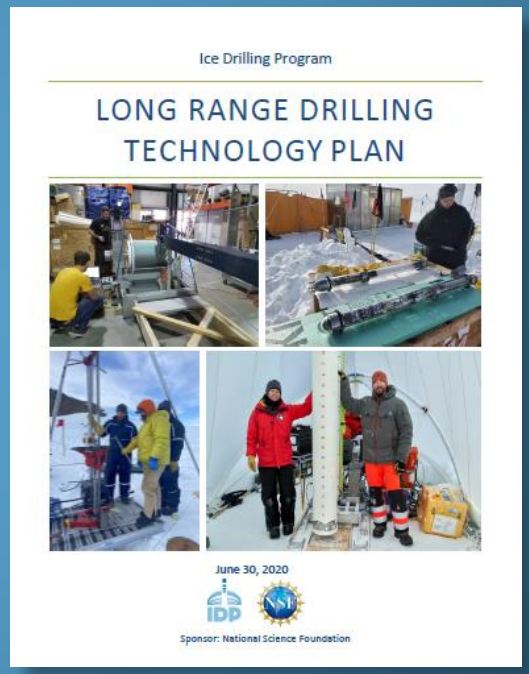
SAB discussion & consensus on Recommendations – March/April
Post to Icedrill.org & invite community comment – May
Final to NSF – June

https://icedrill.org/long-range-science-plan

Ice Drilling Program

Integrated Science & Technology Planning





Integrated science and technology planning:
science planning drives drilling tech planning, development, & use.

Updating the Long Range Science Plan:

are the science planning matrices up to date?

Table 4: Past Climate Change Planning Matrix 2021-2031

Note: The table can't be edited. Instead list corrections/updates/additions for the table here:

1. ..

2. ..

	2021				2022				2023				2024				2025				2026				2027				2028				2029				2030				2031			
Past Climate	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Industrial period and glaciology																																											
Arctic hand auger drilling projects[1]	x	x				x	x			x	x			x	x			x	x																							
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SE Greenland mass balance[2]	x	x																																								
Greenland climate & human history[3]	f	f																																								
GreenTracs2[12]						f	f			f	f																															
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Pre-industrial baseline & dynamics																																										
Eclipse Icefield Canada[6]										7	7																															
Greenland coastal ice caps[2]										x	x			x	x																											
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Amundsen Sea coastal dome[4]												x	x																													
South Pole volcanics[8]								4	4																																	
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Detroit Plateau Ant. Peninsula[10]																											7	7			7	7										
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GISP2.1 Central Greenland (near Summit)[11]																																										
Intermediate depth coring to 1650 m																					I	I			I	I																

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Updating the Long Range Science Plan:
SAB prioritizes the IDP Drilling Technology Investments tomorrow

Recommended Technology Investments

The following investments in drilling technologies are needed to accomplish science goals planned for the next decade. Investments prioritized by time, from consensus of the IDP Science Advisory Board, include:

Priority 1 (needed this year):

- Maintain and upgrade agile equipment in inventory, including: Hand Augers, Sidewinders, the 4” Electromechanical Drills, the 3” Electrothermal Drill, the 3.25” Badger-Eclipse Drills, the Stampfli Drill, Logging Winches, the Small Hot Water Drills, the Blue Ice Drill, the Prairie Dog, the Agile Sub-Ice Geological Drill (ASIG), the Rapid Air Movement Drill (RAM) Drill, and the Winkie Drill.
- Implement Foro 400 Drill system modifications following the recent first deployment of the system.
- Finish fabrication of a second ice-ready Winkie Drill.
- Develop the IDP Conceptual Design for clean sample acquisition from a hot water ice coring drill for sediment-laden basal ice samples.
- …etc

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Pathway for New Drilling Tech Development

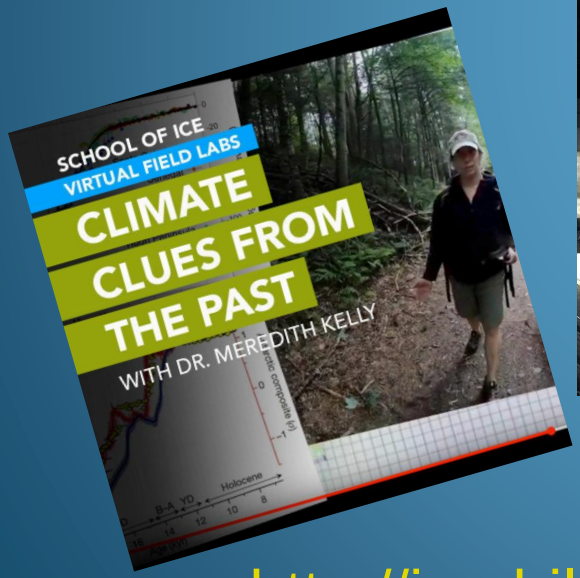
- Community identifies **scientific need** for technology in the IDP Long Range Science Plan
- IDP works with scientists to create the **IDP Science Requirements**
- IDP seeks NSF approval to create the **Conceptual Design**

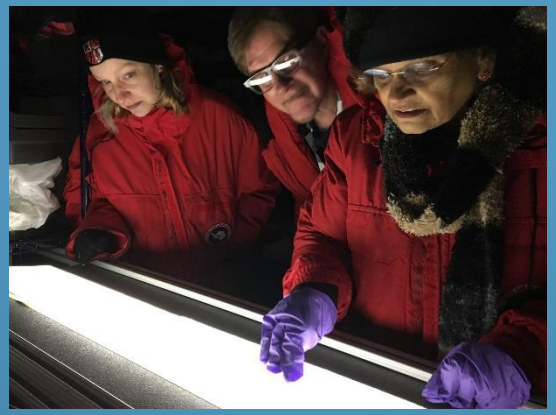
  < NSF Decision Point; if approved, the Conceptual Design is created >
- IDP holds Conceptual Design review with science reps & invited engineers
- IDP seeks NSF approval to create the **Detailed Engineering Design**

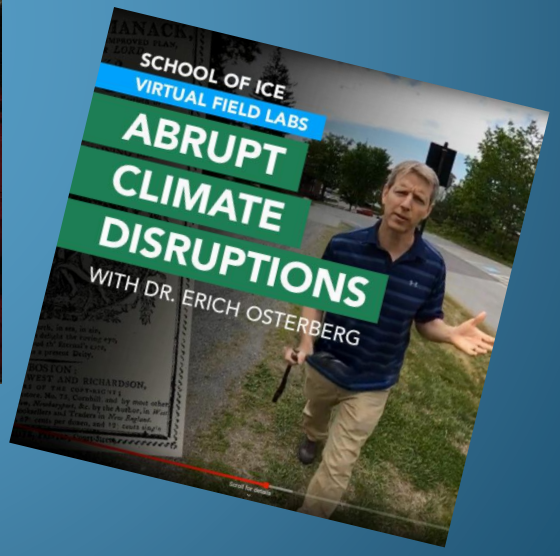
  < NSF Decision Point; if approved, Engineering Design is created>
- IDP holds Engineering Design review with science reps & invited engineers
- IDP seeks NSF approval for **construction** of the drill
- < NSF Decision Point; if approved, new drill is created>
- IDP holds drill test review with invited engineers & science reps
- New tech is **field tested** before deployment for science

Ice Drilling Program
School of Ice

- 4-day IDP workshop for faculty from Minority Serving Institutions
- Ice scientists and engineers share their science
- Louise Huffman & educators present hands-on, discovery-based labs
- MSI faculty learn, use & extend the labs in their classrooms
- Was Virtual in 2020, will be either virtual or at OSU in summer 2021.







http://icedrill-education.org/school-of-ice/

Ice Drilling Program
Education & Public Outreach

Want a broader audience for YOUR science? Talk to Louise!

https://icedrill.org/outreach-support

Louise Huffman
IDP Education & Public Outreach

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www.icedrill-education.org

Ice Drilling Program

Sign up for our quarterly newsletter: *Ice Bits*

ICE BITS NEWSLETTER

WINTER 2014

U.S. Ice Drilling Program

Ice Drilling Program Office | Ice Drilling Design and Operations

Quarterly update of Ice Drilling Program Office (IDPO) and Ice Drilling Design and Operations (IDDO) activities

Rewarding Debut of Intermediate Depth Drill at South Pole Station

Despite weather, aircraft and program administrative delays, IDDO, together with the Antarctic Support Contractor (ASC) and project investigators, successfully completed the first season of the planned two-season South Pole Ice Core project near the South Pole Station. The project aims to recover a 1,500-meter ice core with IDDO's new Intermediate Depth Drill (IDD). A crew of seven IDDO engineers and drillers deployed in early November 2014 to Antarctica to begin set up of the drill site and installation of the IDD. Together with onsite PI, post-docs, and a graduate student core processing staff, the field team surpassed its seasonal drilling goal of 700 meters, collecting 736 meters in total. Nearly 600 meters of core, enough to fill one SAFECORE refrigerated shipping container, safely arrived to the National Ice Core Laboratory in Denver, CO, on March 4, where it will remain for processing this summer.

The SPICE Core team with the first core drilled on December 8, 2014. Credit: Mindy Nicewonger

Ice cores being transported to South Pole skiway. Credit: Leah Street

View of the drilling operation inside the drill tent. Credit: Murat Aydin

View of the core processing station inside the drill tent. Credit: Murat Aydin

Ice Bits Newsletter • Winter 2014 • www.icedrill.org 1

http://icedrill.org/icebits

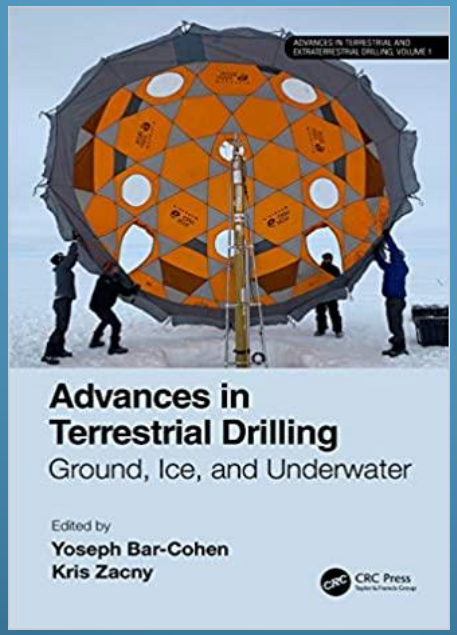
Early Career Travel Opportunity

October 10-15, 2021
Crans-Montana, Switzerland

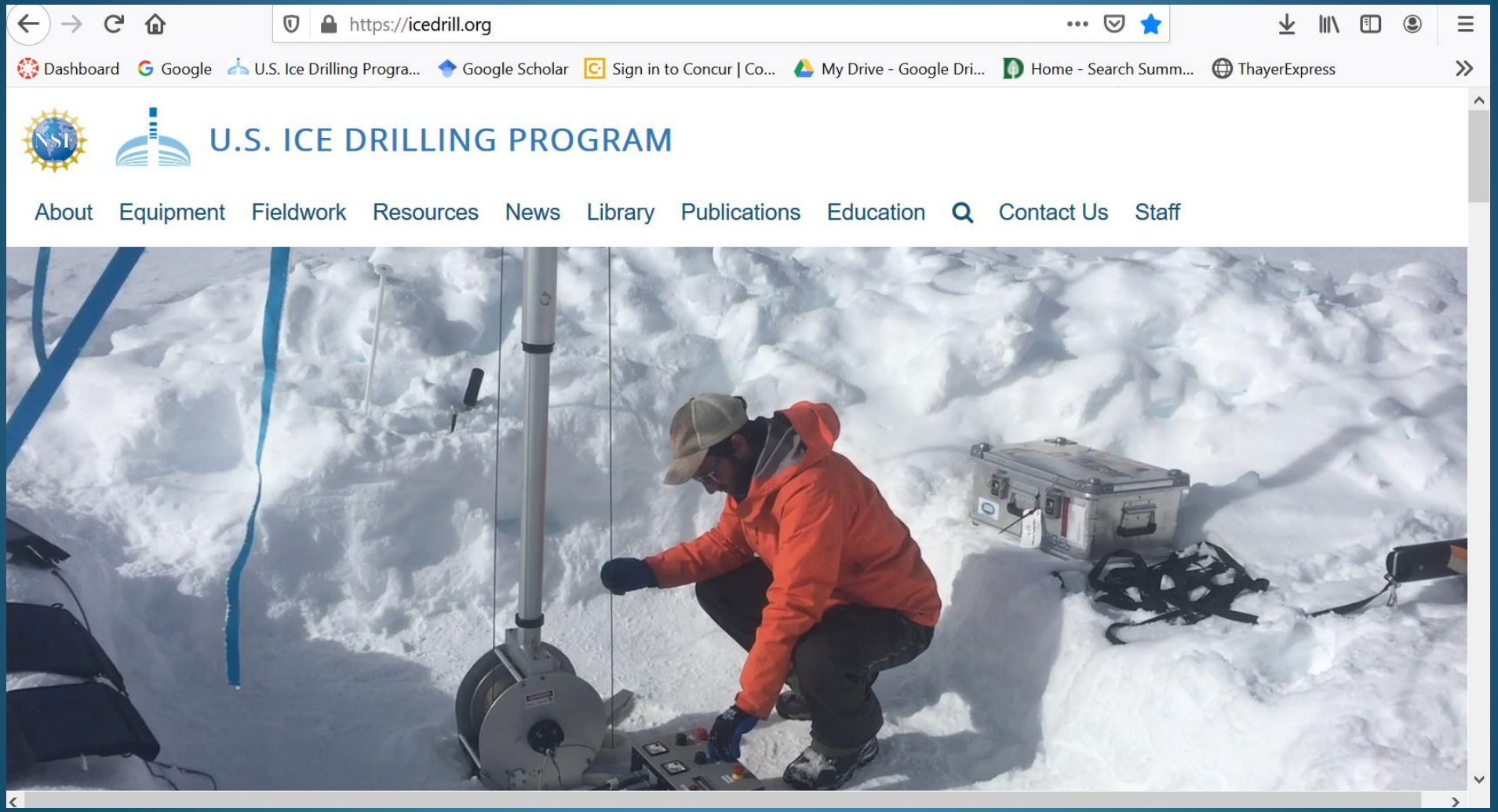
IDP is offering NSF-funded travel reimbursement for early career scientists; Women and minorities are especially encouraged to apply.
Applications due 30 April 2021; awardees notified by June 1.
https://icedrill.org/meetings/early-career-travel-grant-opportunity-2021-ipics-icys-meeting

Recent Publication

Albert, M.R., K.R. Slawny, G. Boeckmann, C.J. Gibson, J. A .Johnson, K. Makinson, J. Rix (2020) **Recent Innovations in Drilling in Ice**. *Chapter 6 of Advances in Terrestrial Drilling: Ground, Ice and Underwater, Bar-Cohen and Zacny, eds.*, 157-220. ISBN 9780367653460.



…and much more info on our website



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