

Polar Special Issue Sponsors

GOLD



SILVER



BRONZE





Senior Editor

Kira Coley

Art Direction / Production

Keith Meinhold

Conferences Manager

Whitney Schwerin

Advertising Sales

Lisa Chilik

+1-574-261-4215

lchilik@tscpublishing.com

Mimi King

+44 (0) 77 7601 7564

mking@tscpublishing.com

Published by

Technology Systems Corporation

Patrick C. Lagrange, CEO

Editorial Board

Carlos M. Duarte, Ph.D.

Mark Fonseca, Ph.D.

Vinicius Lindoso

Christine Valentini

Corporate

+1-772-221-7720

advertise@ecomagazine.com

To Subscribe:

www.ecomagazine.com/subscribe or

subscriptions@ecomagazine.com

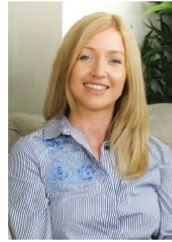


Technology Systems Corp.

Environment Coastal & Offshore Magazine ISSN # 2327-3445 is published by Technology Systems Corporation, 8502 SW Kansas Ave, Stuart, FL 34997, Telephone +1-772-221-7720. Copyright ©2020 Technology Systems Corp. All rights to editorial content are reserved. No article, photograph or illustration may be reproduced in whole or part without the written permission of the publisher. Unless otherwise stated in writing by the contributor, all images submitted to TSC may be used in other promotional materials belonging to TSC without permission. Subscriptions are free to qualified individuals or companies. For all others, call TSC for subscription information. Printed in the USA.



EDITOR'S WELCOME



The Pulse of the Planet

By Kira Coley, Senior Editor

For centuries, the polar regions were too remote, too cold and too treacherous for humans—only the bravest explorer would risk an expedition, often proving near-fatal. These days, though, even the ever-changing and increasingly dangerous melting landscape will not deter an adventure-seeking tourist.

Scientist or not, many are eager to endure freezing conditions to witness the inimitable frozen cliffs and ice-clad vistas unique to the Arctic and Antarctic regions. In fact, polar travellers now outnumber Antarctic scientists 10:1, with nearly 59,367 visitors landing in the 2019/2020 season.

Russian Scientist and Polar Explorer, Victor Boyarsky, once said that the South Pole was like visiting Disneyland, Las Vegas, and Mars simultaneously. But unlike Vegas, what happens at the poles doesn't stay at the poles. Although remote, the Arctic and Antarctic are intricately connected to the rest of the planet. Every year, the ice encapsulating Earth's polar regions expand and contract—an icy 'heartbeat' contributing freshwater and nutrients to the ocean ecosystem and influencing sea levels, weather, and climate conditions around the world.

As thousands flock to the poles each year on holiday, conducting science here is still fraught with challenges. "Carrying out research in the Antarctic and Southern Ocean is a global endeavor. With an area greater than that of the United States and Mexico combined, Antarctica is so vast and inaccessible that no individual nation can alone unlock its secrets," writes the **Scientific Committee on Antarctic Research (SCAR)**. The importance of unlocking the secrets of the Arctic Ocean, Antarctica and the Alpine regions (considered the 3rd pole) pushes scientists to find new ways to obtain data; be it via innovative technology, citizen science, or new cross-sector collaborations that edge us closer to the data needed to safeguard our future.

We wanted to showcase some of this vital research and technological advancements underway today. As such, ECO Magazine has partnered with SCAR, the **Arctic Circle Assembly**, and the **Association of Polar Early Career Scientists (APECS)** to bring you our second Special Edition of 2020: **Polar Research and Exploration**. Within this 144-page digital exclusive, we share the latest research investigating *Life Above & Below the Ice*, *Polar Environments*, *Innovation in Frozen Seas* and *Humans at the Poles*. Each story offers a glimpse into the recent knowledge gained—and that is still needed—in predicting the rate of melting ice-sheets and sea-level rise; the effects of climate change on biodiversity in these regions; and the heroic efforts of polar scientists as they search for the answers to some of the most important and pressing questions of our time.

The world will continue to monitor the pulse of the planet through the annual expansion and contraction of ice in the polar regions—a pulse that is weakening as the ice melts.

Thank you to the sponsors of this special edition for helping us spread awareness about these important polar issues, and for supporting the contributing scientists and industry members in their efforts to advance our knowledge in the field.

Editor's Welcome

03 The Pulse of the Planet

Polar Community

06 A New Global Structure for Arctic Dialogue

08 Early Career Leadership in Polar Research

10 The Scientific Committee on Antarctic Research

12 Polar Heroes 2020

16 In Memory of Konrad Steffen

Life Above & Below the Ice

20 Observing Hidden Phytoplankton in the Autonomous Era

24 Listening to the Chukchi Sea

28 A Helping Hand in Phytoplankton Research

32 King Crabs Threaten Antarctic Shelf Communities

36 Hunting Aliens in Antarctica

41 Using the Smallest Pieces to Solve the Biggest Puzzles

45 Snow Petrels as Indicators of Climate Change

Polar Environments

52 Radars and Ice Cores Reveal Styles of Retreat of Greenland and Antarctic Ice Sheets

56 Exploring the Unknown Northern Polar Regions

60 Temporal Dynamics in Surge and Calving of Tunabreen Glacier in Svalbard

64 A Treasure from the Deep

68 From Sea Ice Melt to Seasonal Floods: How Does the Arctic Affect Our Weather?

73 Polar Climate Variability and Asian Monsoon - Teleconnections and Feedback

76 Nitrous Oxide: The Unaccounted Climate Change Agent from Permafrost Soils



ECO Magazine is a leading international trade publication reporting on core topics, critical issues and emerging trends in ocean science, innovation and exploration. Subscribe for free today to support our mission. www.ecomagazine.com

www.ecomagazine.com/subscribe



www.ecomagazine.com/subscribe

Innovation in Frozen Seas

- 82 Scientific Diving in Antarctica
- 84 Mooring-Based Measurements for Marine Polar Ecosystem Research
- 86 Making Waves: A New Polar Research Ship for Britain
- 88 Inverted Tilt Current Meters Under Land-Fast Ice in Greenland
- 90 SMS Messages from a Frozen Ocean: Monitoring Ice Shelf Ocean Cavities
- 92 Velox: The Ice-Skating Robot
- 94 Sea Level Rise in the Canadian Arctic
- 96 Exploration in Unmanned Environments
- 98 The Snow and Ice Mass Balance Apparatus
- 102 Engineered for Extreme Environments
- 104 ADCPs Aid Pioneering Study of How Glaciers Melt
- 106 New Nutrient Sensors Provide Icy Insights

Humans at the Poles

- 112 Plastic in the Arctic Ocean
- 116 Antarctica and the COVID-19 Pandemic
- 120 Sea-Ice Knowledge for Travel Safety by Inuit for Inuit
- 124 Polar Educators Germany
- 126 Social Sciences and Beyond in the Arctic
- 131 Waste in Cities on Ice
- 134 Polar Science is Expensive, But Does it Have to Be?
- 138 WWF Arctic Programme: Tackling the Reality of a Rapidly Changing Arctic
- 140 INDEX

POLAR 2020 **eco** 5