6th International Symposium on
Chemosynthesis-Based Ecosystems
at Woods Hole Oceanographic Institution
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This program is current as of August 22, 2017. Please refer to cbe2017.org for up-to-date information.
Welcome to CBE6 2017

On behalf of everyone who was involved in the organization of the Sixth International Symposium on Chemosynthesis-Based Ecosystems, we are very happy to welcome you to Woods Hole on beautiful Cape Cod. The timing could not be better, as this year marks the 40th anniversary of the groundbreaking discovery of hydrothermal vents and chemosynthetic communities at the Galápagos Spreading Center, in which Woods Hole Oceanographic Institution played an important role. We have come a long way since then, and it is exciting to gather on this occasion to celebrate the discovery, while at the same time discussing the newest findings and developments in studying chemosynthesis-based ecosystems and their societal relevance.

In your bag, you will find information that we have put together to help you navigate the symposium and to enjoy your stay in the area. The symposium plenary sessions and presentations will take place in Redfield Auditorium and poster sessions will take place on the 5th floor of Clark Lab. Associated with the poster sessions will be a reception with hors d’oeuvres and beer/wine, and we would like to encourage your participation in these events. This time, we will also have selected number of posters to be presented as flash talks, 3-minute presentations intended to entice interest among participants to come visit the poster.

To help you to get around, there will be a bus to transport participants between certain hotels, Woods Hole Village, and the Quissett Campus, during the symposium, as well as for the excursions and the symposium dinner. Please note that parking is very limited in Woods Hole Village, and we recommend that if you have your own transportation, you find ways to car-pool and to park on Quissett Campus.

We look forward to an exciting meeting, connecting the past with the present, and offering a glimpse into the future! We hope you will enjoy the meeting and what Falmouth and Cape Cod have to offer. Please do not hesitate to ask if you have any questions.

Sincerely,

Stefan Sievert
Lauren Mullineaux

Co-organizers, CBE6 2017

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CBE6, Woods Hole, MA, USA, Aug 27 – Sep 1 2017
Scientific Committee

- Elizaveta Bonch-Osmolovskaya (Winogradsky Institute of Microbiology, Russia)
- Nicole Dubilier (Max Planck Institute for Marine Microbiology, Germany)
- Chuck Fisher (Pennsylvania State University, USA)
- Kim Juniper (University of Victoria, Canada)
- Nadine Le Bris (Université Pierre et Marie Curie, Banyuls-sur-Mer, France)
- Lisa Levin (Scripps Institution of Oceanography, USA)
- Crispin Little (University of Leeds, UK)
- Ashley Rowden (National Institute of Water and Atmospheric Research, New Zealand)
- Fengping Wang (Shanghai Jiao Tong University, China)
- Hiromi Watanabe (Japan Agency for Marine-Earth Science and Technology, Japan)

Local Organizing Committee

- Stefan Sievert, Chair (WHOI)
- Lauren Mullineaux (WHOI)
- Colleen Cavanaugh (Harvard)
- Breca Govenar (Rhode Island College)
- Tim Shank (WHOI)
- Andrew Daly, Symposium Coordinator (WHOI)
- Kate McMullen, Administrative (WHOI)

Special thanks to Katherine Spencer Joyce (Graphics, WHOI), as well as Erika Fitzpatrick, Stephanie Murphy, Lonny Lippsett, Ken Kostel, and Dina Pandya (all Communications, WHOI) for their invaluable help.
## Symposium Schedule at a Glance

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
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<tbody>
<tr>
<td>7:00 Breakfast</td>
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<td>7:30 Breakfast</td>
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<tr>
<td>8:00 Welcome</td>
<td>7:30 Breakfast</td>
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<tr>
<td>8:15 Introductory remarks</td>
<td>8:30 Plenary: Symbiosis</td>
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<tr>
<td>8:30 Plenary</td>
<td>9:15 Community Structure and Dynamics</td>
<td>8:30 Plenary: Trophic Interactions</td>
<td>8:30 Plenary: Dispersal and Connectivity</td>
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<tr>
<td>9:15 Community Structure and Dynamics</td>
<td>9:15 Microbiology</td>
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<td>10:00 Coffee</td>
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<tr>
<td>12:00 Lunch</td>
<td>12:00 Lunch (InterRidge Mtg)</td>
<td>12:00 Lunch</td>
<td>12:00 Lunch</td>
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<td>14:00</td>
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<tr>
<td>14:20 (Sponsored by the Deep Ocean Stewardship Initiative through a grant by the JM Kaplan Fund)</td>
<td>14:15 Symbiosis</td>
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<td>14:00 Panel</td>
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<td>14:40</td>
<td>14:45</td>
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<td>14:30 Geochemistry and Biogeochemistry</td>
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<tr>
<td>15:00 Coffee</td>
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<td>14:30</td>
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<td>15:30</td>
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<td>15:00 Coffee</td>
<td>15:00 Coffee</td>
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<tr>
<td>15:45 Chemosynthetic Habitats and Society</td>
<td>15:30 Microbiology</td>
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<tr>
<td>17:30 Poster Session I and Reception</td>
<td>18:00 Symposium Dinner</td>
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<td>17:45 Poster Session II and Reception</td>
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<td>19:30</td>
<td>22:00</td>
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</table>
## Full Symposium Schedule

### Sunday, August 27 - Lillie Auditorium

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>18:00</td>
<td><strong>Opening Public Talk:</strong> <em>Discovery of Deep-Sea Vents</em> (Bob Ballard) (Lillie Auditorium, MBL)</td>
</tr>
<tr>
<td>19:00</td>
<td><strong>Panel discussion:</strong> <em>Implications for Life on Earth and Beyond</em> (Lillie Auditorium, MBL)</td>
</tr>
<tr>
<td>20:00</td>
<td>Reception (Tent next to Redfield)</td>
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</tbody>
</table>

### Monday, August 28 - Redfield Auditorium

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Welcome</td>
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<tr>
<td>8:15</td>
<td>Introductory remarks</td>
</tr>
<tr>
<td>8:30</td>
<td><strong>Plenary:</strong> Jim Childress: <em>Early Adventures in Studying the Biology of Hydrothermal Vents</em></td>
</tr>
<tr>
<td>9:15</td>
<td><strong>Community Structure and Dynamics</strong> (Session chair: Chuck Fisher)</td>
</tr>
<tr>
<td>9:15</td>
<td>Rachel Boschen, Verena Tunnicliffe: <em>A functional traits approach to assess differences among assemblages at hydrothermal vents in a marine protected area</em></td>
</tr>
<tr>
<td>9:30</td>
<td>Alanna Durkin, Lisa Levin, Erik E. Cordes: <em>Community ecology of methane seeps along the Costa Rica margin</em></td>
</tr>
<tr>
<td>9:45</td>
<td>Sabine Gollner, Breea Govenar, Pedro Martinez Arbizu, Susan Mills, Nadine Le Bris, Markus Weinbauer, Timothy M. Shank, Monika Bright: <em>Community dynamics at the 9°N East Pacific Rise after a volcanic eruption</em></td>
</tr>
<tr>
<td>10:00</td>
<td>Coffee</td>
</tr>
<tr>
<td>10:30</td>
<td>Ashley Grosche, Donato Giovannelli, Francesco Smedile, Nadine Le Bris, and Costantino Vetriani: <em>The Microbial Biogeography of Deep-Sea Hydrothermal Vents: Mapping the Landscape of Active Microbial Communities Across Space, Time, and Fluid Dynamics</em></td>
</tr>
<tr>
<td>10:45</td>
<td>Thi Phuong Thao Ho, Eunj Kim, Soon Gyu Hong, Eun-Hye Kim, Kangchon Kim, Sook-Jin Jang, Robert C. Vrijenhoek, and Yong-Jin Won: <em>Geographical structure of endosymbiotic bacteria hosted by Bathymodiolus mussels at eastern Pacific hydrothermal vents</em></td>
</tr>
<tr>
<td>11:00</td>
<td>Abbie Chapman, Amanda E. Bates, Verena Tunnicliffe: <em>Contributions of rare and common species to the functional diversity of basalt-hosted tubeworm bush communities from the Juan de Fuca Ridge</em></td>
</tr>
<tr>
<td>11:15</td>
<td>Dimitri Kalenitchenko, Erwan Peru, Nadine Le Bris, Pierre E. Galand: <em>Ultra-rare microorganisms quickly transform deep-sea wood falls into chemosynthesis based ecosystems</em></td>
</tr>
<tr>
<td>11:30</td>
<td>Craig McClain, James Barry, Clifton Nunnally, Thomas Webb: <em>Size and Energy Influenced Niche Packing in Experimental Wood-Fall Communities</em></td>
</tr>
<tr>
<td>11:45</td>
<td>Arunima Sen, Emmelie K.L. Åström, Wei-Li Hong, Pavel Serov, Alexey Portnov, Malin Waage, Michael L. Carroll, JoLynn Carroll: <em>High Arctic cold seeps: visual and acoustic imagery reveal spatial heterogeneity in megafaunal communities and sediment geochemistry</em></td>
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<tr>
<td>Time</td>
<td>Event</td>
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<tr>
<td>12:00</td>
<td>Lunch</td>
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<td></td>
<td><strong>Chemosynthetic Habitats and Society (Invited talks) (Session chair: Lisa Levin)</strong> (Sponsored by the Deep Ocean Stewardship Initiative through a grant by the JM Kaplan Fund)</td>
</tr>
<tr>
<td>13:40</td>
<td>Verena Tunnicliffe: X-traordinary: The Place of Hot Vents in a World of Humanity</td>
</tr>
<tr>
<td>14:00</td>
<td>Alison Swaddling: Overview of SMS Mining Interest in the Pacific</td>
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<tr>
<td>14:20</td>
<td>Erik Cordes: The Influence of Hydrocarbon Seeps on the Deep Sea in the Anthropocene</td>
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<tr>
<td>14:40</td>
<td>Michael Lodge: Perspectives from the International Seabed Authority</td>
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<tr>
<td>15:00</td>
<td>Coffee</td>
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<td></td>
<td><strong>Chemosynthetic Habitats and Society (Session chair: Lisa Levin)</strong></td>
</tr>
<tr>
<td>15:30</td>
<td>Diva Amon, Judith Gobin: Characterisation of deep-sea communities in an area designated for oil and natural-gas exploitation off Trinidad and Tobago</td>
</tr>
<tr>
<td>15:45</td>
<td>Stace Beaulieu, Porter Hoagland, Christopher German, Maurice Tivey: Applying an economic value framework to ecosystem services from deep-sea vents</td>
</tr>
<tr>
<td>16:00</td>
<td>Maria Baker, Lisa Levin, Kristina Gjerde: Deep Ocean Stewardship Initiative (DOSI) progress in relation to deep-sea mining</td>
</tr>
<tr>
<td>16:15</td>
<td>Ana Hilario, Emil Paulsen, Torkild Bakken, Hans Tore Rapp, Eva Ramirez-Llodra: Results from the MarMine cruise: megafauna assemblages from Mohn’s Treasure, a sediment covered massive sulphide deposit in the AMOR</td>
</tr>
<tr>
<td>16:30</td>
<td>Jennifer Le, Shuting Yang, Onyeweenu Ogene, Bryant Jew, Lisa Levin: Ecosystem services associated with methane seeps on the California continental margin</td>
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<tr>
<td>16:45</td>
<td>Announcement by Adrian Glover (Deep-Sea Biology Society)</td>
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<tr>
<td>17:30</td>
<td>Poster session I with selected flash talks* and Reception (Clark 507)</td>
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**Tuesday, August 29 - Redfield Auditorium**

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<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:30</td>
<td>Plenary: Jillian Petersen: Symbiosis and Holobiont Physiology: A New Understanding of the Roles and Functions of Chemosynthetic Symbionts in Bivalves</td>
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<td><strong>Habitat Structure and Dynamics (Session chair: Ashley Rowden)</strong></td>
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<tr>
<td>9:00</td>
<td>Robert Carney, Kern Kassarie: Spatial distribution of chemosynthetic fauna determined by extensive AUV digital-image survey within a 15 km² portion of the central graben of a salt-formed ridge in the Gulf of Mexico</td>
</tr>
<tr>
<td>9:15</td>
<td>Cherisse Du Preez, Charles R. Fisher: Remarkable decadal stability at Lau Basin hydrothermal vents (Southwest Pacific)</td>
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<tr>
<td>9:30</td>
<td>Lisa Levin: Oxygen Minimum Zones as Creators and Modifiers of Chemosynthetic Ecosystems</td>
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<tr>
<td>Time</td>
<td>Speaker(s)</td>
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<tr>
<td>9:45</td>
<td>Heiko Sahling, Maxim Rubin Blum, Christian Borowski, Elva Escobar-Briones, Chieh-Wei Hsu, Markus Loher, <strong>Ian MacDonald</strong>, et al.</td>
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**Symbiosis (Session chairs: Colleen Cavanaugh and Nicole Dublier)**

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<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Title/Abstract</th>
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<tbody>
<tr>
<td>10:30</td>
<td>Roxanne Beinart, J. Rotterova, S. Sylva, I. Cepicka, J. S. Seewald, R.G. Gast, V.P. Edgcomb</td>
<td><em>Metabolic functioning of a ciliate-methanogen symbiosis from anoxic habitats</em></td>
</tr>
<tr>
<td>10:45</td>
<td>Christian Borowski, Adrien Assié, Nikolaus Leisch, Matthew Saxton, Samantha Joye, Halina Tegetmeyer, Harald Gruber-Vodicka, Karina van der Heijden, et al.</td>
<td><em>A novel and specific association of bathymodiolin mussels with Epsilonproteobacteria that is widespread at deep-sea hydrothermal vents and cold seeps</em></td>
</tr>
<tr>
<td>11:00</td>
<td>Corinna Breusing, Shannon B. Johnson, C. Robert Young, Robert C. Vrijenhoek</td>
<td><em>Cryptic diversity and host-symbiont specificity in Pacific deep-sea tubeworms</em></td>
</tr>
<tr>
<td>11:15</td>
<td>Chong Chen, Dilworth Y. Parkinson, Katsuyuki Uematsu, Katrin Linse, Julia D. Sigwart</td>
<td><em>A new lease of life: Ontogenetic shift in anatomy and ecology of a holobiont vent snail shown using synchrotron micro-CT</em></td>
</tr>
<tr>
<td>11:30</td>
<td>Sebastien Duperron, Olivier Gros, Bérénice Piquet, Kamil Szafranski, Sven Laming, Bruce Shillito</td>
<td><em>The flexible symbioses of deep-sea mussels: a not-so-straight story</em></td>
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<tr>
<td>12:00</td>
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<td>Lunch (InterRidge meeting: Future plans, code of conduct, working groups)</td>
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<td>13:45</td>
<td>Stephanie Markert</td>
<td><em>Marine thiotrophic symbioses—examined by physiological proteomics</em></td>
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<tr>
<td>14:00</td>
<td>Julia Polzin, Thomas Nussbaumer, Manuel Kleiner, Dan Liu, Thomas Rattei, Jillian M. Petersen</td>
<td><em>Understanding mechanisms of host-microbe interactions in lucinid clams</em></td>
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<tr>
<td>14:15</td>
<td>Pei-Yuan Qian, Jin Sun, Jian-Wen Qiu</td>
<td><em>Adaptation of deep-sea mussels to chemosynthetic environments revealed by full genome analysis</em></td>
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<tr>
<td>14:30</td>
<td>Maxim Rubin-Blum, Christian Borowski, Chakkiath Paul Antony, Lizbeth Sayavedra, Thomas Pape, Heiko Sahling, Gerhard Bohrmann, Nicole Dubilier</td>
<td><em>Invertebrate-microbe symbioses at asphalt volcanoes in the deep Gulf of Mexico</em></td>
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<tr>
<td>14:45</td>
<td>Shelbi Russell, Colleen M Cavanaugh</td>
<td><em>Impacts of transmission mode on chemosynthetic symbiont genome evolution: A population genomic perspective</em></td>
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<tr>
<td>15:00</td>
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<td>Coffee</td>
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</table>
Microbiology (Session chair: Fengping Wang)

15:30  Julie Huber, Caroline S. Fortunato, Christopher K. Algar, Lisa Zeigler Allen, David A. Butterfield, James F. Holden, Benjamin I. Larson, Begüm Topçuoğlu: Spatially distinct, temporally stable chemolithoautotrophic microbial populations mediate biogeochemical cycling at and below the seafloor in venting fluids from Axial Seamount

15:45  Sean M. McAllister, Shawn W. Polson, Clara S. Chan: Using marine Fe mat meta-omics to gain insights into Zetaproteobacteria functional diversity, ecological interactions, and biogeochemical roles

16:00  Heather Olins, Peter Girguis: In situ mineral colonization samplers reveal patterns in microbial community composition, structure, and succession

16:15  David Emerson, Jarrod J. Scott, Craig Moyer: New insights into chemosynthetic Fe-oxidizing communities at hydrothermal vents

16:30  Florian Götz, Stephanie Markert, Dörte Becher, Thomas Schweder, Stefan M. Sievert: Metaproteomics Reveals the Metabolic Pathways of Active Chemoautotrophic Communities at Crab Spa, a Diffuse-Flow Deep-Sea Vent site at 9°N EPR

16:45  Costantino Vetriani, Manuel Amieva, Donato Giovannelli, Sushmita Patwardhan, Francesco Smedile: Common adaptive strategies in hydrothermal vent and pathogenic Epsilonproteobacteria revealed by comparative genomic and physiological analyses

18:00  Symposium Dinner at Sea Crest Beach Hotel (www.seacrestbeachhotel.com)

Wednesday, August 30

All day excursions

Thursday, August 31 - Redfield Auditorium

8:30  Plenary: Marie Portail: Food Webs in Deep-Sea Chemosynthetic Ecosystems, the Missing Link between the Structure and Function of Biodiversity

Microbiology (Session chair: Costantino Vetriani)

9:00  Yinzhao Wang, Fengxiao Yuan, Jiahua Wang, Jialin Hou, Fengping Wang: High abundance and diversity of anaerobic hydrocarbon metabolizing archaea in sediment of Guaymas Basin


9:30  Mohamed Jebbar: Thermococcales in the genomic era: diversity, physiology, applications and adaptation to deep sea hydrothermal vent conditions
<table>
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<th>Time</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>10:00</td>
<td>Coffee</td>
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<tr>
<td>10:30</td>
<td>Holly Bik, Taruna Aggarwal</td>
<td>Diversity patterns of nematode microbiomes around a Pacific whale fall site (off-coast California)</td>
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<tr>
<td>10:45</td>
<td>Sheryl Murdock, S. Kim Juniper</td>
<td>Hydrothermal Vent Protists: The Missing Piece to the Puzzle</td>
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**Chemosynthetic Energy Transfer (Session chairs: Breea Govenar and Nadine Le Bris)**

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<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>11:00</td>
<td>Bérengère Husson, Jozee Sarrazin, Dick van Oevelen, Pierre-Marie Sarradin, Karline Soetart, and Alain Menesguen</td>
<td>Integrating knowledge and getting insights on chemosynthetic-based ecosystems: a modelling approach</td>
</tr>
<tr>
<td>11:15</td>
<td>Peter Girguis, Charles P.M. Vidoudez, Roxanne Beinart, Daniel Hoer, Jessica Panzarino, Jennifer Delaney</td>
<td>Mantle to microbe to molluscs and more: The role of chemosynthetic symbioses in matter and energy flux in chemosynthetic ecosystems</td>
</tr>
<tr>
<td>11:30</td>
<td>Nicholas Higgs, Jason Newton, Martin Attrill</td>
<td>A chemosynthesis based food chain supports commercial lobster fisheries</td>
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<tr>
<td>12:00</td>
<td>Lunch</td>
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<tr>
<td>13:45</td>
<td>Sarah Seabrook, Fabio C. De Leo, Andrew R. Thurber</td>
<td>Feast in the deep: The use of chemosynthetic nutrients by the Tanner crab</td>
</tr>
<tr>
<td>14:00</td>
<td>Serban M. Sarbu, Kenneth H. Nealson, Casey Barr, Joost W. Aert, Rob J.M. Van Spanning, Nicu-Vioroiu Atudorei, Jean-François Flot, Radu Popa</td>
<td>Chemosynthesis based cave ecosystems at liquid:gas and gas:gas redox interfaces</td>
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**Geochemistry and Biogeochemistry (Session chair: Nadine Le Bris)**

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<th>Time</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>14:30</td>
<td>Solveig Bühring, Stefan M. Sievert, Philip Arevalo, Lara Gulmann, Gonzalo V. Gomez Saez, Petra Pop Ristova</td>
<td>The shallow submarine hot vent system off Milos (Greece) – a natural laboratory to study hydrothermal geomicrobiology</td>
</tr>
<tr>
<td>15:00</td>
<td>Coffee</td>
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</tbody>
</table>
Evolution (including evolutionary history) (Session chair: Cris Little)

15:30  **Crispin Little:** A 3.77—or possibly 4.28—billion-year history of microbial communities associated with marine hydrothermal vents

15:45  **Steffen Kiel:** Clams ’n’ Trends ‘n’ Marine Sulfate Concentrations: Ocean Chemistry and Macroevolution through Earth History

16:00  **Kazutaka Amano,** Robert G. Jenkins, Steffen Kiel: Paleocene wood-fall communities from eastern Hokkaido, northern Japan

16:15  **Robert Gwyn Jenkins,** Andrzej Kaim: Chemosynthetic community on Cretaceous marine reptile falls

16:30  **Andrzej Kaim,** Robert Jenkins, Krzysztof Hryniewicz, Horacio Parent, Alberto Garrido: Early Mesozoic seeps and the advent of modern seep faunas

16:45  **Mari Heggernes Eilertsen,** Jon A. Kongsrud, Tom Alvestad, Josefin Stiller, Greg W. Rouse, Hans T. Rapp: Do ampharetids take sedimented steps from vents to seeps? Phylogeny and habitat-use of Ampharetidae (Annelida, Terebelliformia) in chemosynthesis-based ecosystems

17:00  **Magdalena Georgieva,** Crispin T.S. Little, Jonathan S. Watson, Mark A. Sephton, Alexander D. Ball, Adrian G. Glover: Identification of fossil worm tubes from Phanerozoic hydrothermal vents and cold seeps

17:45 Poster session II with selected flash talks* and Reception (Clark 507)

Friday, September 1 - Redfield Auditorium

8:30  **Plenary:** Satoshi Mitarai: Quantifying Dispersal from Hydrothermal Vent Fields in the Western Pacific Ocean

Evolution (including evolutionary history) (Session chair: Cris Little)

9:00  **Sook-Jin Jang,** Eunji Park, Won-Kyung Lee, Shannon B. Johnson, Robert C. Vrijenhoek, and **Yong-Jin Won:** Population subdivision of hydrothermal vent polychaete Alvinella pompejana across equatorial and Easter Microplate boundaries

9:15  **Shannon Johnson,** Greg W. Rouse, Sara Teixiera, Robert C. Vrijenhoek: Evolution of Oasisia, an unusual polytypic vestimentiferan

9:30  **Yuanning Li,** Kenneth M. Halanych: Comparative genomics reveal symbiont-host evolution of deep-sea tubeworms

9:45  **Rob Young:** Ubiquitous Episodic Selection on Protein Coding Genes in Vesicomyid Symbiont Genomes

10:00 Coffee

Biogeography (Session chairs: Lauren Mullineaux and Hiromi Watanabe)

10:30  **Ana Colaço,** Maria Rakka, Pedro Ribeiro, Manuela Juliano: Key species dispersal and population connectivity at different spatial scales and under different disturbance scenarios at fragmented habitats of the MAR
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<th>Time</th>
<th>Speaker(s)</th>
<th>Title/Abstract</th>
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<tbody>
<tr>
<td>10:45</td>
<td><strong>Austin Phillips</strong>, Mike Neubert, Lauren Mullineaux, Julie Kellner, Stace Beaulieu</td>
<td><em>Tools for Evaluating the Importance of Habitat Patches in Hydrothermal Vent Metapopulations</em></td>
</tr>
<tr>
<td>11:00</td>
<td><strong>Adrian Glover</strong>, Helena Wiklund, Jonathan T. Copley</td>
<td><em>Biogeography of annelids from newly-explored Caribbean, Indian Ocean and Southern Ocean hydrothermal vents</em></td>
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<tr>
<td>11:15</td>
<td><strong>Won-Kyung Lee</strong>, Won-Gi Min, Se-Jong Ju</td>
<td><em>Biodiversity and spatial distribution of vent fauna in the hydrothermal fields on the spreading axis of North Fiji Basin based on ROV visual survey</em></td>
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<tr>
<td>11:45</td>
<td><strong>Hiromi Watanabe</strong>, Takuya Yahagi, Shigeaki Kojima, Satoshi Mitarai, Hiroyuki Yamamoto</td>
<td><em>Dispersal and population maintenance of two hydrothermal vent shrimps, Alvinocaris longirostris and Shinkaiicaris leurokolos</em></td>
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<tr>
<td>12:00</td>
<td><strong>Craig Young</strong>, Laurel Hiebert, Terra Hiebert, Kara Robbins, Caitlin Plowman, Amy Burgess, Kirstin Meyer, Cindy van Dover, et al.</td>
<td><em>Distributions of cold-seep bivalve larvae in the Western North Atlantic, Caribbean, and Gulf of Mexico</em></td>
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<tr>
<td>12:15</td>
<td></td>
<td>Lunch</td>
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<tr>
<td>14:00</td>
<td><strong>Panel</strong>: Future Research Directions and Societal Relevance of Chemosynthetic-Based Ecosystems</td>
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<td>15:30</td>
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# Poster session I with selected flash talks* and Reception
Monday August 28, 17:30, Clark 507

### Posters: Chemosynthetic Habitats and Society

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<td>1</td>
<td>Verena Tunnicliffe*, Amanda E. Bates, David A. Butterfield, Benjamin I. Larson: <strong>Regional diversity of the Mariana biogeographic region with a closer look at Alviniconcha hessleri, the original “hairy snail”</strong> (Please note: Poster moved from Biogeography section due to scheduling conflict.)</td>
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<tr>
<td>2</td>
<td>Amber Cobley, Adrian Glover, Maria Baker, Jon Copley: <strong>Open oceans, open data: Biodiversity and policy in the deep-sea mining frontier</strong></td>
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<td>4</td>
<td>Ward Appeltans, Nicholas Higgs: <strong>Introduction to the new deep-sea node of the Ocean Biogeographic Information System</strong></td>
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<td>5</td>
<td>Tina Molodtsova, Galkin S.V., Gebruk A.V., Dobretsova I.G.: <strong>Fauna of soft sediments and inactive hydrothermal sulfide deposits in the Russian Exploration Area on the Mid-Atlantic Ridge</strong></td>
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### Posters: Geochemistry and Biogeochemistry

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<td>Hailey Conrad: <strong>Time series analysis of hydrothermal vent growth, flow coloration, and colony changes at Mushroom Vent in ASHES Field off the coast of Oregon</strong></td>
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<td>7</td>
<td>Jennifer Houghton, Dionysis Foustoukos: <strong>Microbial sulfur oxidation under high pressure conditions: A whiff of O2</strong></td>
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<td>8</td>
<td>Benjamin Jelen, Donato Giovannelli, Costantino Vetriani: <strong>Revealing the genes responsible for sulfur respiration in Thermovibrio ammonificans</strong></td>
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<td>9</td>
<td>Midori Suzuki, Robert Jenkins, Shouzo Ogiso, Masahiro Matada, Nobuo Suzuki: <strong>Decay process of sea turtle-falls and their related ecosystems</strong></td>
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### Posters: Microbiology

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<td>Dionysis Foustoukos, Sushmita Patwardhan, Kelli Mullane, Francesco Smedile, Ileana Pérez-Rodriguez, and Costa Vetriani: <strong>Lithotrophic nitrate reduction under high-pressure conditions at deep-sea vents</strong></td>
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<td>12</td>
<td>Jialin Hou, Muhammad Zohaib Nawaz, Stefan Sievert, Xiang Xiao, Fengping Wang: <strong>Comparative metagenomics reveals contrasting microbial communities inhabiting deep-sea chimneys at different stages of activity</strong></td>
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<td>13</td>
<td>Dimitri Kalenitchenko, Erwan Peru, Pierre E. Galand, Nadine Le Bris: <strong>High-resolution monitoring of deep-sea wood falls fill the gap between in situ conditions and microcosm experiments</strong></td>
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<td>14</td>
<td>Sushmita Patwardhan*, Donato Giovannelli, Costantino Vetriani: <strong>Prokaryotic Diversity and Function at a Newly Discovered Shallow-water Gas Vent Site in the Tyrrenhenian Sea</strong></td>
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<td>15</td>
<td>Adelaide Rhodes, Alex Emch, Elizabeth Lee, Heaven Roberts: <strong>Identifying potential microbial drivers of community succession and organization near deep sea hydrothermal vents</strong></td>
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<tr>
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<td>Authors</td>
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<td>16</td>
<td>Kathleen Scott, Juliana Leonard, Ryan Keeley, and USF MCB 4404L</td>
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<td>17</td>
<td>Camila Signori*, Vivian H. Pellizari, Stefan M. Sievert</td>
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<td>Francesco Smedile, Ashley Grosche, Sushmita Patwardhan, Donato Giovannelli, Ben Jelen, Costantino Vettri</td>
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<td>19</td>
<td>Tresa Thomas*, Vijayakumar Kanojia, LokaBharathi PA</td>
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<td>Andrew Thurber*, Sarah Seabrook, and Rory Welsh</td>
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**Posters: Symbiosis**

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<td>Tjorven Hinzke*</td>
<td>Physiological basis of the Riftia pachyptila symbiosis</td>
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<td>23</td>
<td>Yi Lan*, Jin Sun, Weipeng Zhang, Ting Xu, Chong Chen, Jian-Wen Qiu, Pei-Yuan Qian</td>
<td>Interaction relationship between a chemosymbiotic Calyptogena clam and its vertically-transmitted endosymbiont revealed through meta-transcriptome sequencing</td>
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<td>24</td>
<td>Juliana Leonard, Jessica Panzarino, Roxanne Beinart, Jon Sanders, Jennifer Delaney, Peter Girguis, Kathleen Scott</td>
<td>Redox substrates and autotrophic pathways of Endoriftia Persephone, the gammaproteobacterial endosymbiont of vestimentiferan tubeworm Riftia pachyptila</td>
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<td>26</td>
<td>Jessica Panzarino, Tom Yu, Roxanne Beinart, Jennifer Delaney, Kathleen Scott, Frank Stewart, Peter Girguis</td>
<td>Switch-hitting carbon: An investigation of metabolic flexibility in hydrothermal vent tubeworm symbiosis</td>
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<td>27</td>
<td>Bérénice Piquet*, Bruce Shillito, François Lallier, Ann C. Andersen and Sébastien Duperron</td>
<td>Apoptosis in the tissues of Bathymodiolus mussels under bathymetric pressurized versus unpressurized conditions: the possible role of apoptosis in regulating the branchial microbiota</td>
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<td>28</td>
<td>Szafrański KM*, Deschamps P, Cunha MR, Gaudron SM, Duperron S</td>
<td>Symbiont-related bacteria colonize plant substrates at hydrothermal vents and cold seeps</td>
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<td>29</td>
<td>Yi Yang, Jin Sun, Ting Xu, Jian-Wen Qiu, Pei-Yuan Qian</td>
<td>The symbiotic relationship between a methane seep tubeworm and its symbiont as revealed through meta-transcriptomic analysis</td>
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### Posters: Physiology and Adaptation

| 30  | Joan Bernhard, Giuliana Panieri, Daniel J. Fornari, Mette Marianne Svenning: Gas-hydrate foraminifers: cellular adaptations and first association with putative methanotrophs |
| 31  | Paul Dando, Sophie Pendlebury, Christopher Pham, Ana Colaço: Aquarium observations on the behaviour and nutrition of animals from the hydrothermal vents at the Menez Gwen site on the MAR |
| 33  | Julia Sigwart, Chong Chen, Ken Takai: A first glimpse into the physiology and metabolism of Indian Ocean vent gastropod holobionts |
| 34  | Jin Sun, Ting Xu, Pei-Yuan Qian, Jian-Wen Qiu: Understanding the deep-sea biominerlization tool-kit by comparative proteomic characterization of deep-sea Bathymodiolus and shallow-water Modiolus mussels |

*Presenter also giving a flash talk during poster session

### Poster session II with selected flash talks* and Reception

Thursday August 31, 17:45, Clark 507

### Posters: Community Structure and Dynamics

<p>| 35  | Joan Manel Alfaro-Lucas*, Martin Foviaux, Daniela Zeppilli, Florence Pradillon, Jozée Sarrazin: The role of environmental filtering on community structure in the vicinity of hydrothermal vents in the Lucky Strike vent field (Mid-Atlantic Ridge) |
| 36  | Emmelie Astrom*, Arunima Sen, Michael L. Carroll, William G. Ambrose Jr, JoLynn Carroll: Methane release at underwater mounds in the Barents Sea (76° N) and its impact on Arctic macro-benthic faunal communities |
| 37  | Jill Bourque, Amanda W.J. Demopoulos: Drivers of benthic community structure at hydrocarbon seep communities along the western Atlantic margin |
| 38  | Fabio Cabrera De Leo, Steve Mihály, S. Kim Juniper: 8 years of continuous monitoring of NE Pacific cold-seeps and hydrothermal vents using the NEPTUNE cabled observatory |
| 39  | Adriana Gaytan-Caballero, Elva Escobar Briones, Heiko Sahling, Ian MacDonald: Preliminary results on biodiversity of Campeche knolls, Mexico: high connectivity of species |
| 40  | Yann Lelièvre, Pierre Legendre, Marjolaine Matabos, Steve Mihály, Raymond W. Lee, Pierre-Marie Sarradin, Claudia P. Arango, Jozée Sarrazin: Astronomical and atmospheric impacts on deep-sea hydrothermal vent invertebrates |
| 41  | Susan Mills, Nadine Le Bris, Stace Beaulieu, Nam Siu, Lauren Mullineaux: Community matters: Post-eruption settlement at vent sites with and without a surviving animal community |
| 42  | Phillip Turner*, Cindy L. Van Dover: Contributions of rare and abundant species to the functional diversity of deep-sea hydrothermal vent communities |</p>
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<td>43</td>
<td>Jamie Wagner, Clara Smart, Christopher German</td>
<td>Extensive microbial mats discovered at seep in oxygen minimum zone off the CA coast by Redondo Knoll</td>
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### Posters: Biogeography

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<td>Steffen Kiel</td>
<td>Biogeography of the vent and seep fauna—a network approach</td>
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<td>48</td>
<td>Dongsung Kim, Won-Gi Min, Hyun Soo Rho, Se-Jong Ju</td>
<td>Comparison of faunal assemblages by the hydrothermal chimney type at southern Lau back-arc basin revealed by high-resolution video image</td>
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<td>49</td>
<td>Clifton Nunnally*, Craig McClain</td>
<td>Traits associated with of species associated with deep-sea wood falls and niche width expansion shared between chemoosymbiotic communities</td>
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<td>50</td>
<td>Olivia Pereira*, Mauricio Shimabukuro, Angelo F. Bernardino, Paulo Y. G. Sumida</td>
<td>Occurrence of Alvinocaris muricola in whale bones from the SW Atlantic: molecular proximity with the Atlantic Equatorial Belt population</td>
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<td>52</td>
<td>Dongsheng Zhang</td>
<td>Phylogeny of Ophrytrocha (Polychaeta, Dorvilleidae) from hydrothermal vents with descriptions of six new species</td>
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<td>53</td>
<td>Yadong Zhou, Ruiyan Zhang, Dongsheng Zhang, Bo Lu, Rongcheng Lin, Chunsheng Wang</td>
<td>Diversity and biogeography of vent fauna at hydrothermal vents from Southwest Indian Ocean Ridge</td>
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### Posters: Evolution (including evolutionary history)

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<td>54</td>
<td>Suzanne Dufour*, McIlroy, D.</td>
<td>Ediacaran fossils suggest a role for chemosynthesis in early animal evolution</td>
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<td>55</td>
<td>Suzanne Dufour*</td>
<td>Farmers and ranchers: how thyasirid bivalves associate with chemoosymbiotic bacteria</td>
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<td>56</td>
<td>Magdalena Georgieva, Crispin T.S. Little, Alexander D. Ball, Adrian G. Glover</td>
<td>Microbial-tubeworm associations in a 440-million-year-old hydrothermal vent community</td>
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<tr>
<td>57</td>
<td>Krzysztof Hryniewicz, Kazutaka Amano, Robert G. Jenkins, Steffen Kiel</td>
<td>Thyasirid bivalves from ancient cold seeps and their evolution</td>
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<td>58</td>
<td>Didier Jollivet, Alexis Biyo, Marie Verhaye, Anne-Sophie Le Port, Baptiste Faure, Jean Mary</td>
<td>Protected polymorphism of phosphoglucomutase in the Pompeii worm and its variant adaptability is only governed by two QE linked mutations</td>
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<td>59</td>
<td>Genki Kobayashi*, Ryutarou Goto, Tsuyoshi Takano, Shigeaki Kojima</td>
<td>Evolutionary shift from infaunal to epifaunal lifestyle may have enabled bamboo worms (Annelida: Maldanidae) to invade chemosynthesis-based ecosystems</td>
</tr>
</tbody>
</table>
Crispin Little, Fiona L. Gill, Jordan Bestwick, Ian C. Harding, Jonathan A. Todd and Steffen Kiel: *Paleogene and Neogene Caribbean and South American seep communities*

Yuichi Nakajima, Masako Nakamura, Hiromi Watanabe, Satoshi Mitarai: *Stepping-stone larval dispersal contributes to genetic diversity and connectivity among populations of a hydrothermal vent limpet in the Okinawa Trough*

**Posters: Life History**

Shawn Arellano, Chelsea Collins, and Jacob T. Krodel: *Larval development and feeding in two species of an abundant snail at hydrothermal vents on the Mariana Arc and Back-Arc system*

Caitlin Plowman*, Craig M. Young: *Reproductive patterns of cold-seep mussels in the western Atlantic and Gulf of Mexico: effects of depth and detritus*

Andrey Vedenin, Galkin Sergey, Kokarev Valentin, Andrey Gebruk: *Bottom community associated with shallow-water methane seep in the Laptev Sea*

**Posters: Trophic Ecology**

Helena Wiklund, Diva J Amon, Adrian G. Glover: *Three new Ophryotrocha species (Polychaeta: Dorvilleidae) from hydrothermal vent and whale-fall habitats in the Southern Ocean*

Breea Govenar, Leah Smith, Brittany Baker: *Identifying invertebrate prey of hydrothermal vent gastropods*

Se-Jong Ju, Ah-Ra Ko, Won-Kyung Lee: *Understanding the energy flow of hydrothermal vent ecosystem in North Fiji Basin using stable isotope ratios and lipid biomarkers*

*Presenter also giving a flash talk during poster session*
Excursions

**Martha’s Vineyard Bus tour**
Hotel pickup from 7:30 a.m., depart Island Queen Ferry from Falmouth Harbor at 9:00 a.m. for arriving at charming Oak Bluffs. We’ll take a full island bus tour (3 hrs), including visits to Edgartown, the fishing village Menemsha, and the clay cliffs and lighthouse at Gay Head. Afternoon can be spent at your leisure before returning to Woods Hole.

**Martha’s Vineyard Bike Tour**
Hotel pick-up from 7:30 a.m., depart Island Queen Ferry from Falmouth Harbor at 9:00 a.m. for arriving at charming Oak Bluffs. Rent bikes (included), ride to scenic Edgartown with stops in between. Lunch on your own and free time in Edgartown, ride to beautiful Katama Beach and time at beach. Return to Oak Bluffs and take ferry to Woods Hole at 6:15 p.m. (arrival at 7 p.m.).

**National Seashore Outing**
Hotel pickup from 9a.m., depart for Cape Cod National Seashore. Nature walk on the beach (10:30 a.m. to 12:30 p.m.), then lunch on your own at Mac’s on the Pier, Wellfleet, back to Falmouth by 4:30pm.

**Shining Sea Bikeway Tour**
19 miles (30 km)
Hotel pickup from 8:30 a.m. Bike 9 a.m. to 1 p.m. Bike rental, lunch, and hotel pickup/drop-off included.

**Whale Watch and Natural History Museum**
Hotel pickup from 9a.m., depart for Cape Cod Museum of Natural History. Lunch on your own at Mattakeese Wharf or Osterville Fish Too. 2:30 to 6:30 p.m., Hyannis Whale Watcher Cruises. Return to Falmouth by ~7:30 p.m.

**Woods Hole Tours**
11:30 a.m. to 1:00 p.m. Meet at WHOI Information Office in Woods Hole and visit WHOI facilities and listen to anecdotes with deep-sea microbiologist Carl Wirsen (free tickets still available).

2 p.m. to 4:15 p.m. Meet at WHOI Information Office in Woods Hole and go on an entertaining and informative tour of WHOI, NOAA Aquarium, and MBL Marine Resource Center with deep-sea biologist Stace Beaulieu (sold out).
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J.M. Kaplan Fund
www.jmkfund.org
Participants

Joan M. Alfaro-Lucas
joanmanel.alfaro@e-campus.uab.cat
Ifremer, Plouzane, France

Kazutaka Amano
amano@juen.ac.jp
Joetsu University of Education, Joetsu, Japan

Diva Amon
divaamon@gmail.com
Natural History Museum, London, UK

Shawn Arellano
shawn.arellano@wwu.edu
Western Washington University, Bellingham, WA USA

Emmelie Astrom
emmelie.k.astrom@uit.no
CAGE - Arctic University of Tromsø, Tromsø, Norway

Maria Baker
mb11@noc.soton.ac.uk
University of Southampton, UK

Robert Ballard
Center for Ocean Exploration, URI, Narragansett, RI USA

Stace Beaulieu
sbeaulieu@whoi.edu
WHOI, Woods Hole, MA USA

Roxanne Beinart
rbeinart@uri.edu
University of Rhode Island, Narragansett, RI USA

Joan Bernhard
jbernhard@whoi.edu
WHOI, Woods Hole, MA USA

Holly Bik
holly.bik@ucr.edu
UC Riverside, Riverside, CA USA

Christian Borowski
cborowski@mpi-bremen.de
Max Planck Institute, Bremen, Germany

Rachel Boschen
reboschen@uvic.ca
University of Victoria, Canada

Jill Bourque
jbourque@usgs.gov
Wetland and Aquatic Research Center, U.S. Geological Survey, Gainesville, FL USA

Andrew Bowen
abowen@whoi.edu
WHOI, Woods Hole, MA USA

David Brankovits
david.brankovits@gmail.com
Texas A&M University, Galveston, TX USA

Corinna Breusing
cbreusing@mbari.org
Monterey Bay Aquarium Research Institute, Moss Landing, CA USA

Solveig Bühring
solveig.buehring@uni-bremen.de
MARUM - University of Bremen, Germany

Fabio Cabrera De Leo
fdeleo@uvic.ca
University of Victoria, Canada

Robert Carney
tcarnel@lsu.edu
Louisiana State University, Baton Rouge, LA USA

Colleen Cavanaugh
cavanaugh@fas.harvard.edu
Harvard University

Clara Chan
csch@udel.edu
University of Delaware, Newark, DE USA

Abbie Chapman
asac1g09@soton.ac.uk
University of Southampton, UK

Chong Chen
ccchen@jamstec.go.jp
JAMSTEC, Yokosuka, Japan

James Childress
childress@lifesci.ucsb.edu
UCSB, Santa Barbara, CA USA

Amber Cobley
acc2g10@soton.ac.uk
Natural History Museum, London, UK

Ana Colaco
maria.aa.colaco@uac.pt
Universidade dos Açores, Horta, Portugal

Hailey Conrad
hmc87@scarletmail.rutgers.edu
Rutgers University, New Brunswick, NJ USA

Erik Cordes
ecordes@temple.edu
Temple University, Philadelphia, PA USA

Bronwen Currie
currie32@gmail.com
Ministry of Fisheries and Marine Resources, Swakopmund, Namibia

Paul Dando
pdando@mba.ac.uk
Marine Biological Association, Plymouth, UK

Matt Davidson
J.M. Kaplan Fund

Cherisse Du Preez
cpd4@psu.edu
Penn State, State College, PA USA

Nicole Dubilier
ndubilie@mpi-bremen.de
Max Planck Institute, Bremen, Germany

Suzanne Dufour
dsfour@mun.ca
Memorial University, St. John’s, Canada

Sebastien Duperron
sebastien.duperron@upmc.fr
UPMC - UMR BOREA, Paris, France

Alanna Durkin
alanna.durkin@temple.edu
Temple University, Philadelphia, PA USA

Mari Hegghernes Eilertsen
mari.eilertsen@uib.no
University of Bergen, Norway

David Emerson
demerson@bigelow.org
Bigelow, East Boothbay, ME USA

Chuck Fisher
crf2@psu.edu
Penn State, State College, PA USA

Dionysis Foustoukos
dfoustoukos@ciw.edu
Carnegie Institution of Washington, DC USA

Diego Franco
diecasfranco@usp.br
Universidade de São Paulo, Brazil
Françoise Gaill
francoise.gaill@cnrs-dir.fr
CNRS, France

Suzanne Garrett
sgarrett@oceanleadership.org
Ocean Leadership, Washington, DC USA

Adriana Gaytán-Caballero
adriana.gaytan@comunidad.unam.mx
Universidad Autonoma de Mexico, Mexico City, Mexico

Andrey Gebruk
agebruk@gmail.com
P.P. Shirshov Institute of Oceanology, Moscow, Russia

Magdalena Georgieva
m.georgieva@nhm.ac.uk
Natural History Museum, London, UK

Chris German
cgerman@whoi.edu
WHOI, Woods Hole, MA USA

Peter Girgis
pgirgis@oech.harvard.edu
Harvard University, Cambridge, MA USA

Kristina Gjerde
kgjerde@eip.com.pl
IUCN Global Marine and Polar Programme, Cambridge, MA USA

Adrian Glover
a.glover@nhm.ac.uk
Natural History Museum, London, UK

Christopher Glein
cglein@swri.edu
Southwest Research Institute, San Antonio, TX USA

Judith Gobin
judith.gobin@sta.uwi.edu
University of the West Indies, Kingston, Jamaica

Sabine Gollner
sabine.gollner@nioz.nl
NIOZ, Texel, Netherlands

Florian Götz
fgoetz@whoi.edu
WHOI, Woods Hole, MA USA

Breea Govenar
bgovenar@ric.edu
Rhode Island College, Providence, RI USA

Ashley Grosche
ashley.grosche@rutgers.edu
Rutgers University, New Brunswick, NJ USA

Lara Gulmann
lgulmann@whoi.edu
WHOI, Woods Hole, MA USA

Harriet Harden-Davies
hhd829@uowmail.edu.au
University of Wollongong, Australia

Nicholas Higgs
nicholas.higgs@plymouth.ac.uk
Plymouth University, Plymouth, UK

Ana Hilário
ahilario@ua.pt
University of Aveiro, Portugal

Tjorven Hinzke
tjorven.hinzke@stud.uni-greifswald.de
University of Greifswald, Greifswald, Germany

Phuong-Thao Ho
cloverchicken@gmail.com
Ewha Womans University, Seoul City, South Korea

James Holden
jholden@microbio.umass.edu
University of Massachusetts, Amherst, MA USA

Jialin Hou
houjialin6@sjtu.edu.cn
Shanghai Jiaotong University, China

Jennifer Houghton
jhoughton@levee.wustl.edu
Washington University in St. Louis, MO USA

Krzysztof Hryniewicz
krzysztof@twarda.pan.pl
Polish Academy of Science, Warsaw, Poland

Julie Huber
jhuber@whoi.edu
WHOI, Woods Hole, MA USA

Bérengère Husson
husson.berengere@gmail.com
Ifremer, Plouzane, France

Frida Hybertsen
fhybertsen@gmail.com
Swedish Museum of Natural History, Stockholm, Sweden

Mohamed Jebbar
mohamed.jebbar@univ-brest.fr
Université de Bretagne Occidentale, Plouzane, France

Benjamin Jelen
ben.jelen@rutgers.edu
Rutgers University, New Brunswick, NJ USA

Robert Jenkins
robert@staff.kanazawa-u.ac.jp
Kanazawa University, Kanazawa, Japan

Shannon Johnson
sjohnson@mbari.org
MBARI, Moss Landing, CA USA

Se-Jong Ju
sjju@kiost.ac.kr
Korea Institute of Ocean Science and Technology, Ansan, South Korea

Megan Jungwiwattanaporn
mjungwi@pewtrusts.org
Pew Charitable Trusts, Philadelphia, PA USA

Andrzej Kaim
kaim@twarda.pan.pl
Polish Academy of Science, Warsaw, Poland

Dimitri Kalenitchenko
dimitri.kalenitchenko@gmail.com
Université Laval, Quebec, Canada

Jon Kaye
jon.kaye@moore.org
Gordon and Betty Moore Foundation, Palo Alto, CA USA

Steffen Kiel
steffen.kiel@nrm.se
Swedish Museum of Natural History, Stockholm, Sweden

Dongsung Kim
dskim@kiost.ac.kr
Korea Institute of Ocean Science and Technology, Ansan, South Korea

Frieder Klein
fklein@whoi.edu
WHOI, Woods Hole, MA USA

Genki Kobayashi
genki@kobayashi.com
University of Tokyo, Japan

Elena Krylova
elemenkr@mail.ru
Institute of Oceanology, Moscow, Russia
François Lallier  
lallier@sb-roscoff.fr  
Station Biologique de Roscoff, France

Yi Lan  
ylan@connect.ust.hk  
Hong Kong University of Science and Technology, Hong Kong, China

Jennifer Le  
jtl025@ucsd.edu  
Scripps Institution of Oceanography, La Jolla, CA USA

Nadine Le Bris  
lebris@obs-banyuls.fr  
UPMC, Banyuls-sur-Mer, France

Won-Kyung Lee  
wkle@kioist.ac.kr  
Korea Institute of Ocean Science and Technology, Ansan, South Korea

Yann Lelièvre  
yann.elleievre10@gmail.com  
Ifremer, Plouzané, France

Juliana Leonard  
jl10a@mail.usf.edu  
University of South Florida, Tampa, FL USA

Lisa Levin  
levin@ucsd.edu  
Scripps Institution of Oceanography, La Jolla, CA USA

Yuanning Li  
yzl0084@auburn.edu  
Auburn University, AL USA

Crispin Little  
earest@leeds.ac.uk  
University of Leeds, UK

Michael Lodge  
modge@isa.org.jm  
International Seabed Authority

Evan Lubofski  
elubofsky@gmail.com  
Science Writer, Cape Cod, MA USA

Rich Lutz  
lutz_richard@hotmail.com  
Rutgers University, New Brunswick, NJ USA

Ian MacDonald  
mamah@fso.edu  
Florida State University, Tallahassee, FL USA

Julia Machon  
jamachon@live.fr  
UPMC, Paris, France

Stephanie Markert  
stephanie.markert@uni-greifswald.de  
University of Greifswald Greifswald, Germany

Craig McClain  
cmcclain@lumcon.edu  
Louisiana Universities Marine Consortium, Chauvin, LA USA

Susan Mills  
smills@whoi.edu  
WHOI, Woods Hole, MA USA

Won-Gi Min  
wgmin@kioist.ac.kr  
KIOST, Ansan, South Korea

Satoshi Mitarai  
satoshi@oist.jp  
Okinawa Institute of Science and Technology, Japan

Charles Moore  
C.Moore@jmikfund.org  
J.M. Kaplan Fund

Kaori Motoki  
kaori@bs.s.u-tokyo.ac.jp  
University of Tokyo/ JAMSTEC, Japan

Mark Mueller  
mark.mueller@boem.gov  
BOEM, New Orleans, LA USA

Lauren Mullineaux  
lmullineaux@whoi.edu  
WHOI, Woods Hole, MA USA

Sheryl Murdock  
smurdoch@uvic.ca  
University of Victoria, Canada

Yuichi Nakajima  
yuichi.nakajima@oist.jp  
Okinawa Institute of Science and Technology, Japan

Amanda Netburn  
amanda.netburn@noaa.gov  
NOAA Office of Ocean Exploration and Research, Silver Spring, MD USA

Hidetaka Nomaki  
nomakih@gmail.com  
JAMSTEC, Yokosuka, Japan

Clifton Nunnally  
cnunnally@lumcon.edu  
Louisiana Universities Marine Consortium, Chauvin, LA USA

Heather Olins  
heatherolins@gmail.com  
Boston College, MA USA

Giuliana Panieri  
giuliana.panieri@unibo.it  
CAGE University of Tromsø, Tromsø, Norway

Jessica Panzarino  
jessicapanzarino@fas.harvard.edu  
Harvard University, Cambridge, MA USA

Lucie Pastor  
lucie.pastor@ifremer.fr  
Ifremer, Plouzané, France

Sushmita Patwardhan  
sushmita.patwardhan@gmail.com  
Rutgers University, New Brunswick, NJ USA

Olivia Soares Pereira  
oliva.sperere@hotmail.com  
Universidade de Sao Paulo, Brazil

Maeva Perez  
a7777@uvic.ca  
University of Victoria, Canada

Jillian Petersen  
petersen@microbial-ecology.net  
University of Vienna, Austria

Austin Phillips  
aphillips@whoi.edu  
WHOI, Woods Hole, MA USA

Bérénice Piquet  
berenicepiquet@gmail.com  
UPMC Paris/Roscoff, France

Caitlin Plowman  
cmpowman@uoregon.edu  
The Oregon Institute of Marine Biology, Charleston, OR USA

Julia Polzin  
polzin@microbial-ecology.net  
University of Vienna, Austria

Marie Portail  
mari.cao.anoa.portail@gmail.com  
Universidade dos Açores, Horta, Portugal

Adelaide Rhodes  
adelaide.rhodes@cgrb.oregonstate.edu  
Oregon State University, Corvallis, OR USA
Ashley Rowden  
a.rowden@niwa.co.nz  
NIWA, Wellington, New Zealand

Maxim Rubin-Blum  
mrubin@mpi-bremen.de  
Max Planck Institute Bremen, Germany

Shelbi Russell  
selbirusell@gmail.com  
UC Santa Cruz, CA USA

Serban M. Sarbu  
serban.sarbu@yahoo.com  
California State University, Chico, CA USA

Thomas Schweder  
schweder@uni-greifswald.de  
University of Greifswald, Greifswald, Germany

Kathleen Scott  
kmscott@usf.edu  
University of South Florida, Tampa, FL USA

Sarah Seabrook  
seabrooks@oregonstate.edu  
Oregon State University, Corvallis, OR USA

Arunima Sen  
arunima.sen@uit.no  
CAGE-Arctic University of Tromsø, Tromsø, Norway

Timothy Shank  
tshank@whoi.edu  
WHOI, Woods Hole, MA USA

Stefan Sievert  
ssievert@whoi.edu  
WHOI, Woods Hole, MA USA

Camila Signori  
camisignori@hotmail.com  
Universidade de São Paulo, Brazil

Francesco Smedile  
smedile@marine.rutgers.edu  
Rutgers University, New Brunswick, NJ USA

Candice St. Germain  
candicestg@oceanblueconsulting.org  
Ocean Blue Consulting

April Stabbins  
april.stabbins@temple.edu  
Temple University, Philadelphia, PA USA

Jin Sun  
sunjinsd@gmail.com  
Hong Kong University of Science and Technology, Hong Kong, China

Midori Suzuki  
green.s.tat.711@gmail.com  
Kanazawa University, Kanazawa City, Japan

Alison Swaddling  
aswaddling@gmail.com  
Sydney, Australia

Kamil Szafrański  
szafrański@ipgp.fr  
InterRidge, Paris, France

Carolyn Tepolt  
tepolt@whoi.edu  
WHOI, Woods Hole, MA USA

Tresa Thomas  
tresa2812@gmail.com  
AcSIR, CSIR-National Institute of Oceanography, Goa, India

Andrew Thurber  
thurber@coas.oregonstate.edu  
Oregon State University, Corvallis, OR USA

Verena Tunnicliffe  
verenat@uvic.ca  
University of Victoria, Canada

Phillip Turner  
philip.turner@duke.edu  
Duke University, Beaufort, NC USA

Costantino Vetriani  
vetriani@marine.rutgers.edu  
Rutgers University, New Brunswick, NJ USA

Mary Voytek  
mvoytek@hq.nasa.gov  
NASA, Washington, DC USA

Fengping Wang  
fengpingw@sjtu.edu.cn  
Shanghai Jiao Tong University, China

Yinzhao Wang  
wangyinzhao@yahoo.com  
Shanghai Jiao Tong University, China

Hiromi Watanabe  
hwtanabe@jamstec.go.jp  
JAMSTEC, Yokosuka, Japan

Carl Wirsen  
cwirsen@whoi.edu  
WHOI, Woods Hole, MA USA

Yong-Jin Won  
won@ewha.ac.kr  
Ewha Womans University, Seoul City, South Korea

Xiang Xiao  
oxxiang@sjtu.edu.cn  
Shanghai Jiao Tong University, China

Yi Yang  
yyangcf@connect.ust.hk  
HKUST, Hong Kong, China

Emily Young  
eyoung@hawaii.edu  
University of Hawaii at Manoa, HI USA

Curtis Robert Young  
rob.young@noc.ac.uk  
NOCS, Southampton, UK

Craig Young  
cmyoung@uoregon.edu  
University of Oregon, Charleston, OR USA

Dongsheng Zhang  
dxzhang@oic.org.cn  
Second Institute of Oceanography, Hangzhou, China

Yu Zhang  
zhang.yusjtu@sjtu.edu.cn  
Shanghai Jiao Tong University, China

Kecen Zhou  
kecen.zhou@live.com  
Texas A&M University, College Station, TX USA

Yadong Zhou  
yadong_zhou@sio.org.cn  
SIOSOA, Hangzhou, China
Symposium Transportation and Parking

Symposium plenary sessions and presentations will take place in Redfield Auditorium (Water Street, WHOI’s Village campus) and poster sessions on the 5th floor of Clark Lab (Woods Hole Road, WHOI’s Quissett Campus). There will be a bus to transport participants between certain hotels (see next page), Woods Hole Village and the Quissett Campus. Parking is very limited in Woods Hole Village and it is recommended that if you have your own transportation to park on Quissett Campus, which is included in the symposium shuttle bus route (see next page) and where a WHOI passenger shuttle is also available that goes back and forth to the village (see below). We also recommend car pooling.

WHOI Passenger Shuttle Schedule

For transport between Redfield and Clark, runs every 20 minutes

The Dyers Dock stop is in the parking lot across Water Street from Redfield. The shuttle leaves at :00, :20, :40 past the hour from 8:00 to 17:40.

The Clark stop is in the circle in front of Clark and leaves at :10, :30, :50 past the hour from 8:10 to 17:50.

The shuttle stop (pickup and dropoff) for the Village is at Dyer’s Dock; the shuttle stop for Quissett is at Clark Laboratory.
Hotel Shuttle Bus Schedule*

<table>
<thead>
<tr>
<th>Shuttle Bus Services between CBE6 Designated Hotels, Clark Lab/Parking Lot, and Redfield Bld.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>White Tie Shuttle Bus #1 Route</strong></td>
</tr>
<tr>
<td>Red Horse</td>
</tr>
<tr>
<td>Falmouth Heights Lodge</td>
</tr>
<tr>
<td>Shoreway Acres</td>
</tr>
<tr>
<td>Clark Lab</td>
</tr>
<tr>
<td><strong>White Tie Shuttle Bus #2 Route</strong></td>
</tr>
<tr>
<td>Holiday Inn</td>
</tr>
<tr>
<td>Coonamessett Inn</td>
</tr>
<tr>
<td>Inn on the Square</td>
</tr>
<tr>
<td>Clark Lab</td>
</tr>
</tbody>
</table>

*provided by White Tie Luxury Transportation

Times below are when shuttle buses start pickup routes. There will be at least 2 subsequent trips if needed between these locations and the CBE6 Venue, with pickup times approx. 20-30 mins apart.

**SCHEDULE**

**Sunday, August 27**

<table>
<thead>
<tr>
<th>1st Trip Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:30 p.m.</td>
<td>6:00 p.m. Morss Colloquium at Lillie Auditorium, Woods Hole</td>
</tr>
<tr>
<td>9:00 p.m.</td>
<td>Depart Redfield for hotels</td>
</tr>
</tbody>
</table>

**Monday, August 28**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:30 a.m.</td>
<td>Breakfast starting at 7 a.m., Redfield Tent, Woods Hole Village</td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td>Depart Redfield for Clark Lab Poster Session and Reception</td>
</tr>
<tr>
<td>7:40 p.m.</td>
<td>Depart Clark Lab for Hotels</td>
</tr>
</tbody>
</table>

**Tuesday, August 29**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 a.m.</td>
<td>Breakfast starting at 7:30 a.m., Redfield Tent, Woods Hole Campus</td>
</tr>
<tr>
<td>5:30 p.m.</td>
<td>Depart Redfield for Hotels</td>
</tr>
<tr>
<td>5:30 p.m.</td>
<td>Depart Redfield for Sea Crest Hotel and Symposium Dinner</td>
</tr>
<tr>
<td>8:45 p.m.</td>
<td>Depart Sea Crest for Hotels</td>
</tr>
</tbody>
</table>

**Wednesday, August 30**

Excursion Day (see page 16 for details)

**Thursday, August 31**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 a.m.</td>
<td>Breakfast starting at 7:30 a.m., Redfield Tent, Woods Hole Campus</td>
</tr>
<tr>
<td>5:20 p.m.</td>
<td>Depart Redfield for Clark Lab Poster Session and Reception</td>
</tr>
<tr>
<td>7:55 p.m.</td>
<td>Depart Clark Lab for Hotels</td>
</tr>
</tbody>
</table>

**Friday, September 1**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 a.m.</td>
<td>Breakfast starting at 7:30 a.m., Redfield Tent, Woods Hole Campus</td>
</tr>
<tr>
<td>3:40 p.m.</td>
<td>Depart Redfield for Hotels</td>
</tr>
</tbody>
</table>
Falmouth Map

Public Transportation

**WHOOSH Trolley** runs from Woods Hole (Steamship Authority dock) to Falmouth Mall, $2. Operates from 9:45 to 19:15 every half hour (leaves Falmouth Mall at :15 and :45 past the hour and Woods Hole at :10 and :40 past the hour). Can also be flagged down between stops.

**Falmouth Taxi**

508-548-3100
Hotel Information

**Inn on the Square**
40 North Main Street
Falmouth, MA
Phone: 1-800-676-0000

**Sands of Time**
Motor Inn & Harbor House
549 Woods Hole Road
Woods Hole, Cape Cod, MA 02543
(508) 548-3623 or 800-841-0114

**Holiday Inn**
291 Jones Road
Falmouth, MA
Phone: (877) 272-6415

**Coonamessett Inn**
311 Gifford Street
Falmouth, MA
Phone: (508) 548-2300

**Red Horse Inn**
28 Falmouth Heights
Falmouth, MA
Phone: (508) 548-0053 or (508) 495-0152

**ShoreWay Acres Resort Inn**
59 Shore Street
Falmouth, MA 02540
Email: tab@shorewayacresinn.com
Phone: 508-540-3000

**Sea Crest Beach Hotel**
350 Quaker Road
North Falmouth, MA 02556
Telephone: (800) 225-3110

**Falmouth Heights Motor Lodge**
146 Falmouth Heights Road
Falmouth, MA 02540
Phone: (508) 548-3623 or (800) 468-3623
# Some Suggested Local Restaurants

## Woods Hole:

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captain Kidd (bar/restaurant)</td>
<td>77 Water Street</td>
<td>508-548-8563</td>
</tr>
<tr>
<td>Coffee Obsession (internet café)</td>
<td>38 Water Street</td>
<td>508-540-8130</td>
</tr>
<tr>
<td>Jimmy's Sandwich Shop (hot dogs, hamburgers, sandwiches: take-out mostly, only a few tables)</td>
<td>22 Luscombe Ave.</td>
<td>508-540-6823</td>
</tr>
<tr>
<td>Pie in the Sky (bakery, sandwiches)</td>
<td>10 Water Street</td>
<td>508-540-5475</td>
</tr>
<tr>
<td>Landfall Restaurant</td>
<td>9 Luscombe Ave.</td>
<td>508-548-1758</td>
</tr>
<tr>
<td>Quicks Hole Taqueria</td>
<td>6 Luscombe Ave.</td>
<td>508-495-0792</td>
</tr>
<tr>
<td>Quicks Hole Tavern</td>
<td>29 Railroad Ave.</td>
<td>508-495-0048</td>
</tr>
<tr>
<td>Shuckers Raw Bar in Woods Hole</td>
<td>91A Water Street</td>
<td>508-540-3850</td>
</tr>
<tr>
<td>The 41-70</td>
<td>71 Water Street</td>
<td>508-457-3100</td>
</tr>
<tr>
<td>Water Street Kitchen and Public House</td>
<td>56 Water Street</td>
<td>508-540-5656</td>
</tr>
<tr>
<td>Woods Hole Market and Provision (small grocery store with sandwiches, pizza available)</td>
<td>87 Water Street</td>
<td>508-540-4792</td>
</tr>
</tbody>
</table>

## Falmouth:

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>The British Beer Company (pub)</td>
<td>263 Grand Avenue</td>
<td>508-540-9600</td>
</tr>
<tr>
<td>Anejo Mexican Bistro and Tequila Bar</td>
<td>188 Main St.</td>
<td>508-388-7631</td>
</tr>
<tr>
<td>Bangkok Cuisine</td>
<td>291 Main St.</td>
<td>508-548-1728</td>
</tr>
<tr>
<td>Casino Wharf FX (water view)</td>
<td>286 Grand Ave.</td>
<td>508-540-6160</td>
</tr>
<tr>
<td>Chapoquoit Grill</td>
<td>410 West Falmouth Highway</td>
<td>508-540-7794</td>
</tr>
<tr>
<td>Coonamessett Inn Restaurant</td>
<td>311 Gifford St.</td>
<td>508-548-2300</td>
</tr>
<tr>
<td>The Flying Bridge (water view- some outdoor dining)</td>
<td>220 Scranton Ave.</td>
<td>508-548-2700</td>
</tr>
<tr>
<td>Glass Onion (reservations for 6+ only)</td>
<td>37 North Main St.</td>
<td>508-540-3730</td>
</tr>
<tr>
<td>Simply DiVine Pizza</td>
<td>271 Main St.</td>
<td>508-548-1222</td>
</tr>
<tr>
<td>Osteria La Civetta (Italian)</td>
<td>133 Main St.</td>
<td>508-540-1616</td>
</tr>
<tr>
<td>C·Salt Wine Bar and Grille</td>
<td>75 Davis Straits (Rte 28)</td>
<td>774-763-2954</td>
</tr>
<tr>
<td>Golden Swan (Indian cuisine)</td>
<td>323 Main St.</td>
<td>508-540-6580</td>
</tr>
<tr>
<td>La Cucina Sul Mare (Italian cuisine)</td>
<td>237 Main St.</td>
<td>508-548-5600</td>
</tr>
<tr>
<td>Maison Villatte Boulangerie (French bakery)</td>
<td>267 Main St.</td>
<td>774-255-1855</td>
</tr>
<tr>
<td>Liam Maguire's Irish Pub &amp; Restaurant</td>
<td>273 Main St.</td>
<td>508-548-0285</td>
</tr>
<tr>
<td>Gourmet Garden (Chinese)</td>
<td>452 Main St.</td>
<td>508-540-8204</td>
</tr>
<tr>
<td>Quarterdeck Restaurant (bar/restaurant, cozy atmosphere)</td>
<td>164 Main St.</td>
<td>508-444-8090</td>
</tr>
</tbody>
</table>

*This is just a sampling of the many restaurants around Falmouth and Woods Hole. Ask the locals for recommendations, or if you are looking for something specific.*
In 1977, scientists made a stunning discovery on the bottom of the Pacific Ocean that forever changed our understanding of planet Earth and life on it. They found seafloor vents gushing shimmering, warm, mineral-rich fluids into the cold, dark depths. And, to their complete surprise, they found that the vents were brimming with extraordinary, unexpected life supported by a process known as chemosynthesis, utilizing Earth’s internal energy.

The discovery, made by the collective efforts of scientists and engineers at institutions around the world, spawned a revolution in deep-sea exploration that continues today. The abundance of life that thrives in the deep sea has proven that life can exist in even the most extreme environments, leading to new insights about the evolution of life of on Earth and perhaps elsewhere in the universe.