



# CLIMATE CHANGE INSTITUTE FY2018 Annual Report

Research Activity for the period July 1, 2017 - June 30, 2018



## Annual Report - FY 2018

Research Activity for the period of July 1, 2017 to June 30, 2018

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Office of the Vice President for Research and Dean of the Graduate School FY 2018 Annual Report



#### i. <u>Executive Summary</u>

#### **Major Accomplishments**

Climate change is a major security issue for our country and the world and a defining element for the 21st century. It impacts human and ecosystem health, the economy, causes geopolitical stress, and increases the likelihood of storms, floods, droughts, wildfires and other extreme events. The Climate Change Institute and climate in general is recognized as a Signature Research area in the University of Maine. CCI has a legacy of transformational contributions to the understanding of the physical, chemical, biological and social interfacing of climate change and the application of these findings at local to international scales. To this end the Institute has launched a conceptual framework for developing climate change adaptation and sustainability planning that includes continually enhanced, publicly available software to understand past, present and future changes in climate and vulnerability to climate change through the formulation of plausible scenarios for the prediction of annual to multi-decadal scale climate change. This framework now forms a primary initiative for CCI entitled Climate Futures. Within this framework CCI is undertaking plausible scenario climate planning for Maine and several other regions such as: West Africa, the Southern Hemisphere, and Central Asia. In addition, CCI developed an Arctic Futures Institute in collaboration with the UM Law School and the World Ocean Observatory. This activity is intended to provide a focal point for understanding and applying the complex interaction of physical, chemical, biological, social, business, policy and law associated with Arctic warming and implications for Maine and the Northern Hemisphere.

CCI continues to maintain its high level of research funding, return on indirect, publications, state, national and international collaboration, outreach and its role as the focal point for the University of Maine's climate change research excellence. Examples for the current reporting year follow. CCI is currently involved in 107 research grants and contracts. Return on investment remains high at \$7.52. Research productivity is summarized in the form of peer-reviewed publications (214), chapters (14) and books (2). CCI provides a climate change medium for several academic units at the university (eg., Schools of Earth and Climate Sciences, Marine Sciences, Biology and Ecology, Business, Department of Anthropology), and interacts with State of Maine agencies (eg., Department of Environmental Protection, Department of Conservation, Forestry and Agriculture, Department of Transportation, Maine Geological Survey, Maine Inland Fisheries and Wildlife, Maine Center for Disease Control, Department of Licensing and Regulatory Services), federal agencies (eg., Environmental Protection Agency, Department of the Interior, National Park Service, US Department of Agriculture, US Forest Service, Natural Resource Conservation Service, US Department of Commerce, National Oceanic and Atmospheric Administration; Maine-based nongovernmental organizations (eg., Blue Hill Heritage Trust, Friends of Acadia, Maine Lakes Society, Maine Audubon), and both national (eg., Harvard, Princeton, Dartmouth, University of Washington, University of Colorado) and international research organizations (eg., Scientific Committee for Antarctic Research, United Nations, Victoria University (New Zealand), Universidade Federal do Rio Grande do Sul (Brazil), Magallanes University (Chile), Australian National University, Heidelberg University and Alfred Wegener Institute (Germany). CCI has a long tradition of outreach through various media venues, public talks, popular articles, and web-based software with the most prominent example being Climate Reanalyzer.

#### **Highlights (examples)**

• CCI continues to maintain its legacy of field expeditions throughout Maine, the United States,

Antarctica, Greenland, Europe, South Amerca and Asia and as a consequence offering the more than 50 graduate students supported by CCI faculty research grants the opportunity to experience on the ground research and career changing experiences.

- CCI's eleven research laboratories continue produce high quality data leading to transformational scientific discoveries.
- CCI's Climate Reanalyzer<sup>TM</sup> software continues to attract 3000-4000 electronic visits per day from major media sources, researchers and the public.
- Climate Futures is addressing, through private funding, coastal Maine climate change prediction and application.
- CCI-Harvard Science of the Human Past collaboration is redefining "natural" levels of lead in the atmosphere calling for stricter lead abatement standards (>50 media stories worldwide).
- CCI faculty have been awarded many new grants including a NSF early career grant.
- CCI faculty and student continue to be honored for their accomplishments.
- Arctic Futures Institute collaboration is focusing on the convergence of science, law, policy, business, and outreach in response to abrupt Arctic warming.
- CCI social climate researchers and students are engaging in climate change science and policy activities at the United Nations Conference of Parties in Bonn, Germany.
- Advanced technology and big data handling innovations continue to emerge from CCI.

### I. Serving Maine (examples)

A. Community Engagement

CCI standardly provides lectures and other services to K-12, colleges and universities, public, governmental and non-governmental audiences in addition to conducting environmental monitoring of lakes, forests, coastal areas and ecosystems. Examples are presented in the form of media coverage to demonstrate the public reach and application of selected CCI activities:

- E2Tech "Economic impacts of climate change" keynote and panel lead in Portland (Dr. Fernandez).
- Written testimony" Climate change and greenhouse gases" before Maine Department of Environmental Protection Rulemaking Meeting (Dr. Fernandez).
- News Center interview re Maine's tick season (grad student Elias and Dr. Maasch).
- NEXT Radio interview re storm surge/sea level rise along the coast of New England (Dr. Mayewski).
- CCI's 26<sup>th</sup> Annual Borns Symposium an American Geophysical Union style conference focused on grad student presentations and posters with ~100 people this year.
- Camden Conference climate simulation (grad students Kochtitzky and McGinn).
- Bangor Daily News Op Ed (Dr. Fernandez) "We cannot afford to leave science out of policy".
- A video entitled: Ice Core, Memory of the Planet featuring the research of Dr. Mayewski produced for the CHATTERMARK website.
- Washington Post and The Atlantic feature Climate Reanalyzer (Dr. Birkel).
- Bangor Daily News "Flooded bear dens" (Dr. Birkel).
- Coordinating conservation efforts on Maine mountaintops (Dr. MacKenzie).
- BDN OpEd on climate change (Drs. Tisher and Borns).
- BDN "Chances of another storm" (Dr. Birkel).
- Press Herald Lyme disease (grad student Elias and Dr. Birkel).
- Chicago Herald, Detroit News, Portland Press Herald report on Arctic blast (Dr. Birkel) and Discover Magazine.
- BDN Op Ed on national parks (Dr. MacKenzie).
- BDN report on shell midden research (Dr. A. Kelley) and Working Waterfront.

- Republican Journal cites climate and weather workshop series for teachers (Dr. Schauffler).
- Connections between art and environment in the modern world (Dr. J. Kelly) Portland.
- CNET article on extinction and genetically modified animals (Dr. Gill).
- K-12 online data visualization and analysis platform for teachers and students <u>climate.tuvalabs.com</u> (Dr. Schauffler).
- Portland Press Herald article on climate refugees (Drs. Strong, Mayewski, Isenhour).
- One Health Initiative and Lyme disease (CCI grad student Elias).
- Fresh Air NPR interview reports Gulf of Maine summers getting longer and stronger (Dr. Thomas).
- Mount Desert Islander Food Waste discourse (Dr. Isenhour).
- BDN interview re droughts and record rainfall (Dr. Birkel).
- USDA announces climate adaptation funding (Dr. Fernandez).
- PRI the World Necessity to do Climate Research (Dr. Mayewski).
- BDN reports above average precipitation over winter and spring (Dr. Birkel).
- Art of Climate Science a two-month exhibition at UM Hutchinson Center Belfast (CCI grad students and faculty).
- Reuters cites CCI data re Northern Hemisphere heat wave.
- Science teacher's workshops and conferences (Drs. Schauffler and Lyon).
- B. Economic Development
  - Climate Reanalyzer featured at UN Climate negotiations (Drs. Birkel, Strong, Isenhour, CCI grad students Kochtitzky and McGinn).
  - Climate Futures planning framework on-going for Maine with emphasis on the impact of Arctic warming on Maine's climate and economy.
- C. <u>Workforce Development</u>
  - Activities are currently on-going to provide local and broader based plausible climate predictions including the impact of climate change on Maine's commodities. This information is essential to planning for future workplace development and opportunities. Some of this planning has been undertaken as part of a joint CCI-UM Business School course (BUA 645).
- D. One University Initiatives
  - CCI has a long history of collaboration within the University of Maine (currently with 20 units), within Maine (currently with 35 entities), nationally (currently with >25 institutions) and internationally (currently with >30 countries). As part of the evolving One University initiative CCI collaborates with the University of Southern Maine (e.g., "Arctic Showcase") and the University of Maine Law School (e.g., joint BUA course and the Arctic Futures Institute).

#### **II.** Financial Sustainability

A. <u>Research Funding</u>: Submitted & Awarded, Trends (Appendix A)



- B. Intellectual Property Generation (NA)
- C. <u>Revenue Generated</u> (NA)
- D. <u>Private Giving/Alumni Cultivation</u>
   Dan & Betty Churchill Fund, The William Bingham Foundation, Muharram & Barbara Gokcen
   Fund, Russell Grinnell Memorial Trust, Quesada Fund
- E. <u>Initiatives to Increase Fiscal Efficiency</u> CCI discontinued base phone service for all CCI graduate students several years ago; all toll calls related to research are debited to grants; CCI built three web conferencing facilities for <\$1000 each that are used regularly for national and international meetings, courses and conferences.
- F. Other

#### **III. Culture of Excellence**

- A. Faculty Mentoring and Professional Development
  - i. Mentoring of Junior Faculty
    - CCI has 20 early career faculty and post-doctoral fellows all are reviewed regularly and all are proceeding well in their career paths. Several were promoted and tenured this year.
  - ii. Mentoring of Post-Tenure Faculty
    - Most post-tenure CCI faculty are active researchers so mentoring is mostly closely associated with either research advice and/or collaborative research efforts.
  - iii. Evidence of Effectiveness of Mentoring Program
    - CCI faculty have strong records of research funding, productivity, and considerable grad student involvement in research.
  - iv. Examples of Outstanding Mentoring Initiatives
    - Nothing to report.
- B. Faculty Achievements (major examples)
  - 2018 Presidential Public Service Achievement Award (Dr. Fernandez).
  - 2018 NSFA Outstanding Research Award (Dr. Saros).
  - 2018 CLAS Outreach and Service Award (Dr. Isenhour).
  - 2018 National Geographic Society Expedition Science Leader and Senior Advisor (Dr. Mayewski).
  - Science magazine names recovery of ancient ice runner-up for 2017 Breakthrough of the Year (Princeton and CCI Drs. Kurbatov, Mayewski, post-doc Spaulding, grad student Clifford).
  - Press Herald "Mainers of the Year" (Dr. Gill).
  - Environmental Research Letters selected: "Temperature suitability for malaria climbing the Ethiopian Highlands" by (Dr. Lyon et al.) for its Highlights of 2017 collection.
- C. <u>Research and Scholarship Summary</u> (see figures below demonstrating sustained success)



#### 2018 CCI Annual Report - Research Grant Breakdown

|  | FY2017                              |                     |  | FY2018                              |                     |
|--|-------------------------------------|---------------------|--|-------------------------------------|---------------------|
| <u>TOTAL AWARDS</u><br>includes New, Supplemental, Continuation,<br>and Preproposal Grant Submissions & Awards | <u>Total Awards</u><br>\$42,777,041 | <u>Count</u><br>133 |  | <u>Total Awards</u><br>\$37,599,760 | <u>Count</u><br>146 |
| Pending Grant Submissions  | \$22,408,440                        | 45                  |  | \$16,808,334                        | 34                  |
| Declined/Rejected Grant Submissions  | \$3,993,701                         | 15                  |  | \$1,545,295                         | 5                   |
| Withdrawn Grant Submissions  | \$0                                 | 0                   |  | \$0                                 | 0                   |
| New Grants Awarded includes New, Continuation and Supplemental Awards  | \$16,374,900                        | 73                  |  | \$19,246,131                        | 107                 |
|  |                                     |                     |  |                                     |                     |
|  | SUCCESS RATE: 82.95%                |                     |  | SUCCESS RATE:                       | 95.54%              |

2018 CCI Return on Investment (ROI) is \$7.52 dollars per \$1 invested in CCI MEIF and CCI E&G

- D. Curricular Innovations in partnership with Academic Units
  - Joint UM Business School and CCI course in Abrupt climate change, business and policy now includes law through association with UM Law School (Drs. Mahon, Mayewski, Norchi).

#### IV. Student Engagement, Student Success

- A. Student Research, Scholarship or Creative Activities (examples)
  - "Scientist's Guide to the United Nations Framework Convention on Climate Change's Conference of the Parties (COP)" produced by grad students Kochtitzky and McGinn with Drs. Strong and Isenhour.
  - Scholar-athlete makes case for protecting the environment (Greenawalt) with CCI grad student Groff working in Falkland Islands 15 Feb 2018.
  - Climate change art in Press Republican column and many other venues (grad student Pelto)
  - 2017 American Geophysical Union 100 Outstanding Student paper award winner (grad student Radue).
  - Washington Post, Reuters, Daily Mail, The Straits Times, Business Day report finding of massive snowfall among Alaska's highest peaks study (Dr. Kreutz and his grad students).
  - K-12 students follow CCI grad student Kaluzienski in Antarctica.
  - Popular science article reports human source lead pollution in Europe for past 2000 years (Drs. Kurbatov, Mayewski and grad students Clifford, Korotkikh).

#### B. Student Awards

- Science magazine names recovery of ancient ice runner-up for 2017 Breakthrough of the Year (Princeton and Drs. Kurbatov, Mayewski, post-doc Spaulding, grad student Clifford).
- Inside Science reports on glacier melt releasing pollutants (grad student Miner).
- Shackleton Academic scholarship awarded to grad student Groff.
- Dr. Susan J. Hunter Presidental Research Impact Award Susan Elias "Deer Tick Phenology and Warming Climate in Maine, USA" (Dr. Maasch, advisor).
- Dean of Graduate School Undergraduate Mentor Award Third Place William Kochtitzky "What Causes Glaciers to Destablize" (Dr. Kreutz, advisor).

- UMaine Alumni Association Award Emily Blackwood "Virtual Simulation of the Damariscotta Shell Middens" (Dr. A. Kelley, advisor).
- UMaine Student Symposium Social Studies Graduate Winner Kate Pontbriand and Emily Blackwood "Seasonal Analysis of Four Coastal Archaeological Sites in Eastern Maine Using Mollusks" (Dr. Sandweiss, advisor).
- Maine Space Grant Symposium (MSGC) Graduate Fellowship Erin McConnell (Dr. Kreutz, advisor).
- Chase Distinguished Research Assistantship Susan Elias (Dr. Maasch).
- American Geophysical Union First Place (Graduate Virtual Poster) Nick Richmond "3D Bedrock Channel Evolution with Smoothed Particle Hydrodynamics Coupled to a Finite Element Earth" (Dr. Koons, advisor).
- The Churchill Award for Outstanding Exploration (2018 Harold W. Borns Symposium) grad students Kimberley Rain Miner and Mario Williams.
- Best Presentation Award (2018 Harold W. Borns Symposium) Mariah Radue (1<sup>st</sup> place); Benjamin Seliger (2<sup>nd</sup> place); Julia Simonson (3<sup>rd</sup> place).
- Best Poster Award (2018 Harold W. Borns Symposium) Clara Deck and Marima Dryak.
- Student Outstanding Service Award (2018 Harold W. Borns Symposium) Anne St. Amand.

### V. Preserving-Restoring Infrastructure

- A. <u>Renovation /Construction Projects</u>
  - E3RB (Extreme Environment Education and Research Building) completed by Facilities and currently in use for expedition training, equipment design and modification, and field equipment storage and staging.
- B. Renovation/Construction Projects Planned for Coming Year
  - Interior additions to E3RB on-going and modifications to three CCI Sawyer Research Building laboratories.

#### VI. Summary of Anticipated Challenges

For climate change and the Climate Change Institute at the University of Maine to continue to function at the cutting edge of climate change and continue to thrive and lead in the nation and the world requires the following:

- Continued growth in tenure track faculty positions shared between CCI and its legacy academic partners (School of Earth and Climate Sciences, Department of Anthropology, School of Biology and Ecology) and continued collaboration between CCI and cooperating faculty in several other academic and research units such as: Schools of Computing and Information Sciences, Marine Sciences, Forest Resources, Business, and Department of Chemistry.
- Continued addition to CCI of research faculty supported in some cases partly by E&G and/or MEIF in addition to compensation for teaching, and return on indirect.
- Expansion and/or addition of transformative new directions through associated tenure track positions for CCI and climate change at the University of Maine including cyberinfrastructure with an emphasis on data integration, analysis and visualization.
- Resources to enhance outreach via CCI and CCI partners to address the increasing demand for climate information, and support for mitigation, adaptation, sustainability, innovation and entrepeneurial strategies.

#### VII. Summary of New Initiatives for Present Year

- CCI has eight major themes that together describe its breadth of contributions and linkages across the University of Maine and at state, national and international levels, and expectations for the future of CCI and climate change at the University of Maine. These eight themes represent the current evolution of the Institute's approach to the rapidly emerging understanding of climate change and the implications of change.
- Climate Futures, Arctic Futures Institute, and several new federally funded muti-instutional research projects led by CCI researchers.
- The Arctic Futures Institute (AFI) is a joint initiative of the Center for Oceans and Coastal Law in the University of Maine School of Law, the Climate Change Institute and the



World Ocean Observatory. These three founding AFI institutions are a unique combination of science, law, policy, education and communication based in Maine. AFI: (1) Nurtures and leverages an international network in the northern latitudes to advance Maine objectives including research, education and commerce. (2) Contributes to the global effort to balance science and commerce, helping to assure the long-term preservation of the Arctic. and (3) Promotes understanding of Arctic issues through web-based and other communications to build broad public awareness of Arctic issues for Maine, the United States, and throughout the global Arctic community. AFI's first major initiative was a summer institute held in Portland (14-18 June 2018) attended by 25 graduate and professional school students, and by representatives from state and federal agencies, Maine business people, Maine lawyers, the National Guard and the Navy.

• CCI seeks to significantly enhance its involvement in the social and policy aspects of climate change at the state, federal and international level based on an emerging cohort of early career social science faculty now associated with CCI.

#### VIII. Summary of Goals for Upcoming Year

• Continue expanding and enhancing the initiatives described above.

#### IX. Summary of Unit Review(s)

- None done this year
- CCI has typically developed five-year plans and our next five-year iteration will be undertaken Fall 2018.

#### X. List of All Faculty Associated with the Unit

| Faculty Name    | Center Faculty Title                     | Acad. Unit | M<br>O<br>U<br>* | Initial<br>Appoint<br>Date |
|-----------------|--|------------|------------------|----------------------------|
| Katherine Allen | Cooperating Research Assistant Professor | SECS       |                  | 9/2016                     |
| Daniel Belknap  | Professor Emeritus                       | SECS       |                  | 5/1989                     |
| Nancy Bertler   | Research Assistant Professor             |            |                  | 10/2005                    |
| Sean Birkel     | Research Assistant Professor             | SECS       |                  | 1/2013                     |
| Pascal Bohleber | Research Associate                       |            |                  | 9/2016                     |
| Harold Borns    | Professor Emeritus                       | SECS       |                  | 1973                       |
| Gordon Bromley  | Adjunct Assistant Professor              | SECS       |                  | 10/2014                    |

| Fei Chai           | Cooperating Professor           | SMS                 |   | 9/2002                      |
|--------------------|---------------------------------|---------------------|---|-----------------------------|
| Seth Campbell      | Research Assistant Professor    | SECS                |   | 9/2018                      |
| Sudarshan Chawathe | Cooperating Associate Professor | CIS                 |   | 8/2007                      |
| Ronald Davis       | Professor Emeritus              | SBE                 |   | 0,200,                      |
| George Denton      | Professor                       | SECS                |   | 9/1974                      |
| Phillip Dickens    | Cooperating Associate Professor | CIS                 |   | 3/2017                      |
| Daniel Dixon       | Research Assistant Professor    |                     |   | 5/2013                      |
| Ellyn Enderlin     | Research Assistant Professor    | SECS                |   | 11/2014                     |
| James Fastook      | Cooperating Professor           | CIS                 |   | 6/1989                      |
| Ivan Fernandez     | Cooperating Professor           | Sch. of Forest Res. |   | 3/2009                      |
| Jacquelyn Gill     | Assistant Professor             | SBE                 |   | 9/2013                      |
| Bjorn Grigholm     | Research Assistant Professor    |                     |   | 11/2016                     |
| Brenda Hall        | Professor                       | SECS                |   | 9/2001                      |
| Sarah Hall         | Adjunct Research Professor      |                     |   | 10/2017                     |
| Roger LeB. Hooke   | Cooperating Research Professor  | SECS                |   | 1/1991                      |
| Cindy Isenhour     | Associate Professor             | Dept. of Anthrop.   |   | 9/2017                      |
| George Jacobson    | Professor Emeritus              | SBE                 |   | <i><i>у</i>/<b>_</b>017</i> |
| Shaleen Jain       | Cooperating Associate Professor | CE                  |   | 8/2007                      |
| David Keefer       | Adjunct Professor               |                     |   | 9/2008                      |
| Alice Kelley       | Research Associate Professor    | SECS                |   | 2/2007                      |
| Joseph Kelley      | Cooperating Professor           | SECS                |   | 1/1997                      |
| Peter Koons        | Professor                       | SECS                |   | 4/2006                      |
| Karl Kreutz        | Professor                       | SECS                |   | 7/2000                      |
| Andrei Kurbatov    | Associate Research Professor    | SECS                |   | 9/2006                      |
| Danielle Levesque  | Cooperating Assistant Professor | SBE                 |   | 3/2017                      |
| Bradfield Lyon     | Research Associate Professor    | SBE                 |   | 11/2015                     |
| Kirk Maasch        | Professor                       | SECS                |   | 10/1991                     |
| John Mahon         | Cooperating Professor           | Maine Bus. School   |   | 12/2016                     |
| Paul Mayewski      | Professor                       | SECS                |   | 7/2000                      |
| Brian McGill       | Cooperating Professor           | SBE                 |   | 6/2012                      |
| Lou McNally        | Research Assistant Professor    |                     |   | 11/2013                     |
| Kimberley Miner    | External Associate              |                     | Y | 5/2018                      |
| Alexander More     | Research Assistant Professor    |                     |   | 11/2017                     |
| Peter Neill        | Adjunct Research Associate      |                     |   | 4/2015                      |
| Matthew Nisbett    | Adjunct Associate Professor     |                     |   | 4/2013                      |
| Charles Norchi     | Cooperating Professor           | UM School of Law    |   | 4/2017                      |
| Robert Northington | Research Assistant Professor    |                     |   | 7/2016                      |
| Stephen Norton     | Professor Emeritus              |                     |   |                             |
| Brian Olsen        | Research Associate Professor    | SBE                 |   | 5/2009                      |
| Gordon Oswald      | Research Professor              |                     |   | 12/2004                     |
| Andrew Pershing    | Adjunct Professor               |                     |   | 5/2016                      |
| Aaron Putnam       | Cooperating Assistant Professor | SECS                |   | 9/2016                      |
| Laura Rickard      | Cooperating Assistant Professor | Dept. of Comm.      |   | 9/2016                      |
| Paul Roscoe        | Cooperating Professor           | Dept. of Anthrop.   |   | 9/2002                      |
| Daniel Sandweiss   | Professor                       | Dept. of Anthrop.   |   | 9/1992                      |
| David Sanger       | Professor Emeritus              | Dept. of Anthrop.   |   |                             |
| Jasmine Saros      | Professor                       | SBE                 |   | 7/2007                      |
| W.G. Sayre         | Adjunct Professor               |                     |   | 2/2012                      |
| Joerg Schaefer     | Adjunct Professor               |                     |   | 9/2016                      |
| Molly Schauffler   | Research Assistant Professor    |                     |   | 3/2012                      |
| Kristin Schild     | Research Assistant Professor    | SECS                |   | 2/2018                      |

| Anton Seimon     | Adjunct Assistant Professor     |                   | 4/2013  |
|------------------|---------------------------------|-------------------|---------|
| Jefferson Simoes | Adjunct Professor               |                   | 4/2011  |
| William Sneed    | Research Assistant Professor    |                   | 12/2016 |
| Kristin Sobolik  | Adjunct Professor               |                   | 12/2016 |
| Marcella Sorg    | Research Professor              | Dept. of Anthrop. | 10/2009 |
| Nicole Spaulding | Research Assistant Professor    |                   | 12/2015 |
| J. Curt Stager   | Adjunct Professor               |                   | 9/2003  |
| Aaron Strong     | Cooperating Assistant Professor | SMS               | 2/2017  |
| Jeffrey Thaler   | Cooperating Professor           | UM School of Law  | 9/2012  |
| Andrew Thomas    | Cooperating Professor           | SMS               | 2/2017  |
| Gregory Zaro     | Professor                       | Dept. of Anthrop. | 9/2006  |
|                  |                                 |                   |         |
|                  |                                 |                   |         |

#### APPENDIX A: FY2018 CCI RESEARCH FUNDING - SUBMITTED & AWARDED GRANTS - LISTING INCLUDES ALL ACTIVE AWARDS.

|  | Title  | Role   | Unit  | RESP Sponsor A   | ward Type   |
|--|--|--|---|--|---|
|  | Collaborative Research: Pacific Ocean stratification since the last ice age: New constraints from benthic foraminifera<br>CAREER: Guif of Maine Climate and Ocean Circulation from Deglaciation to the Present   | PI<br>PI   | Lead PI's Department<br>Lead PI's Department  | 100.00% National Science Foundation<br>100.00% National Science Foundation   | \$283,274.00 Cont<br>\$535,689.00 Pend  |
| I, Sean G  | GreenTRACS: A Greenland Traverse for Accumulation & Climate Studies  | PI   | Climate Change Institute  | 100.00% National Science Foundation  | \$169,567.00 Cont   |
|  | Maine Climate Futures: Interactive Data Visualization Resource and<br>Education Outreach for Future Climate Impact Planning  | 81   | Climate Change Institute  | 60.00% Jane's Trust Foundation   | \$141,882.00 Pend   |
|  |  | F1   | -   |  |   |
|  | Request for REU Supplement for NSF grant 1443321   | PI   | Climate Change Institute  | 100.00% National Science Foundation  | \$5,789.00 Cont   |
|  | Resolving the Impact of So-Called "Heinrich Stadial 1" on the Terrestrial Cryosphere of the North Atlantic Region<br>Collaborative Research: Potential direct geologic constraints on ice sheet thickness in the central Transantarctic Mountains during the Pliocene warm   | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% Comer Science and Educational Foundation<br>100.00% National Science Foundation  | \$25,000.00 Cont<br>\$291,563.00 Cont   |
| cy, dordon i c   |  |  | chinate change marture  | 200.00% Hattenia Science Foundation  | 9291,903.00° Com  |
|  | MRI Track 1: Acquisition of High Performance Computing to Model Coastal Responses to a Changing Environment  | Co-PI (Brady)  | School of Marine Sciences   | 15.00% National Science Foundation   | \$266,309.00 Cont<br>\$75.104.00 New  |
| Fei I  | Improving tide-estuary representation in MPAS-Ocean Yr2  | PI   | School of Marine Sciences   | 100.00% US Dept of Energy  | \$75,104.00 New   |
| Uribe, Alicia 🛛 🗚  | Acquistion of LA-ICP-QQQ-MS equipment for in situ trace element and isotopic research and training at the University of Maine  | PI   | School of Earth & Climate Sciences  | 100.00% National Science Foundation  | \$298,269.00 New  |
| on. George   | Heinrich Summers   | PI   | Climate Change Institute  | 100.00% Comer Science and Educational Foundation   | \$40.000.00 Cont  |
| on, George L   | Little Ice Age and Medieval Warm Period: Global or Not?  | PI   | Climate Change Institute  | 50.00% National Geographic Society   | \$30,245.00 New   |
| on, George S   | Southern Hemisphere Persepective on The Last Ice Age   | PI   | Climate Change Institute  | 50.00% National Science Foundation   | \$396,749.00 Pend   |
| n, Daniel 2  | 2018 Mandela Washington Fellowship Institute - University of Maine   | Co-PI (Rubin)  | Margaret Chase Smith Center   | 50.00% US Dept of State  | \$145,000.00 Rejec  |
|  |  |  |   |  |   |
|  | Glaciological analysis in support of the J2F-4 search in Southeast Greenland<br>Antarctic Submarine Melt Variability from Remote Sensing of Icebergs - Yr 1  | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% US Dept. of Defense<br>100.00% National Science Foundation   | \$25,000.00 Cont<br>\$116.033.00 Cont   |
|  | Intra-annual Force Balance Analysis of Tidewater Glaciers  | PI   | Climate Change Institute  | 100.00% National Aeronautics & Space Administration  | \$204,596.00 Cont   |
|  | Intra-annual Force Balance Analysis of Tidewater Glaciers - Ext.   | PI   | CLimate Change Institute  | 100.00% National Aeronautics & Space Administration  | \$59,307.00 Cont  |
|  | Workshop on Communicating Science for Polar Scientists<br>Inferring Greenland flord bathymetry using remote sensing observations   | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% National Aeronautics & Space Administration<br>10.00% National Aeronautics & Space Administration  | \$2,236.00 New<br>\$5,000.00 New  |
| lin, Ellyn F   | Remote Sensing of Icebergs in Greenland's Fjords and Coastal Waters Yr 3   | PI   | Climate Change Institute  | 100.00% National Aeronautics & Space Administration  | \$35,000.00 New   |
| in, Ellyn C  | Collaborative Research: What controls calving? A Greenland-wide test of terminus change mechanisms   | PI   | Climate Change Institute  | 100.00% National Science Foundation  | \$159,670.00 New  |
|  | Antarctic Submarine Melt Variability from Remote Sensing of Leebergs Yrs 2 and 3<br>Mapping Leeberg Melt Variability around Svalbard and the Antarctic Peninsula with Satellite Imagery  | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>5.00% National Aeronautics & Space Administration   | \$252,502.00 New<br>\$124,217.00 Pend   |
|  | Mapping redeer west variability around svaluard and the Antarctic Peninsula with satellite Imagery<br>Linking Ice Mélange Characteristics to Glacier Terminus Evolution  | PI   | Climate Change Institute  | 5.00% National Aeronautics & Space Administration<br>5.00% National Aeronautics & Space Administration   | \$128,310.00 Pend   |
| James 1  |  | Co-PI (Dimmel)   | Lead PI's Department  | 25.00% National Science Foundation   | \$726,524.00 Rejet  |
| , James I  | Transforming mathematics education with an immersive, gesture-based digital learning platform  | Co-PI (Dimmel)   | Lead PTs Department   | 25.00% National Science Foundation   | \$726,524.00 Rejet  |
| dez, Ivan (  | (Seed Grant) Maine's Changing Winter: focus on natural resources, ecology, and the economy   | Co-PI (Nelson)   | School of Forest Resources  | 20.00% US Dept of the Interior   | \$5,000.00 Cont   |
|  | USDA Climate Hub - UMaine Cooperative Agreement Yr 2<br>Nitrogen controls on detrital organic matter dynamics in the Northern Forest: Evidence from a 26-year nitrogen addition experiment at the Bear Brook Watershed   | Co-PI (Servello)   | Maine Agriculture and Forestry Experiment Station<br>School of Forest Resources   | 50.00% US Dept of Agriculture<br>15.00% US Dept of Agriculture   | \$23,000.00 Cont<br>\$79.957.00 Cont  |
|  | Nitrogen controls on detrial organic matter dynamics in the Northern Forest: Evidence in on 220-year nitrogen addition experiment at the bear brook watershed<br>TIREB Renewal: Bioecochemical Mechanisms of Response in the Third Decaded of Whole-Ecosystem Experimental Manipulations at the Bear Brook Watershed in Maine (BBWM)<br>ITREB Renewal: Bioecochemical Mechanisms of Response in the Third Decaded of Whole-Ecosystem Experimental Manipulations at the Bear Brook Watershed in Maine (BBWM)  | PI   | Lead PI's Department  | 50.00% National Science Foundation   | \$89,340.00 Cont  |
|  | LTREB Renewal: Biogeochemical Mechanisms of Response in the Third Decade of Whole-Ecosystem Experimental Manipulations at the Bear Brook Watershed in Maine (BBWM) Yr2   | PI   | Lead PI's Department  | 50.00% National Science Foundation   | \$89,898.00 Con   |
|  | LTREB: Renewal: Biogeochemical Mechanisms of Response Yr3<br>LTREB: Renewal: Biogeochemical Mechanisms of Response Yr4   | PI   | Lead PI's Department  | 50.00% National Science Foundation   | \$89,974.00 Con<br>\$89,942.00 Con  |
|  | LIRE: Renewal: Biogeochemical Mechanisms of Response Yr5   | PI   | Lead PI's Department<br>Lead PI's Department  | 50.00% National Science Foundation<br>100.00% National Science Foundation  | \$89,942.00 Con<br>\$89.721.00 Con  |
| ez, Ivan A   | Assessing and monitoring the influce of forest management practices on soil productivity, carbon storage, and conservation in the Acadian Forest Region  | Co-PI (Puhlick)  | Center for Research on Sustainable Forests  | 10.00% Sustainable Forestry Initiative   | \$90,000.00 Con   |
| ez, Ivan S   | SEP Integrated National Framework for Cellulosic Drop in Fuels   | Co-PI (Pendse)   | Forest Bioproducts Research Institute   | 5.00% National Science Foundation  | \$1,774,741.00 Con  |
|  | SEP Integrated National Framework for Cellulosic Drop in Fuels +\$<br>USDA Climate Hub - UMaine Cooperative Agreement Yr 2   | Co-PI (Pendse)<br>Co-PI (Servello)   | Forest Bioproducts Research Institute<br>Maine Agriculture and Forestry Experiment Station  | 5.00% National Science Foundation<br>50.00% US Dept of Agriculture   | \$95,523.00 Con<br>\$15,000.00 New  |
|  | Gaordannace Lindo Sumane Cooperative Systems 11 2  | PI   | School of Forest Resources  | 30.00% US Dept of Agriculture  | \$45,709.00 New   |
| lez, Ivan C  | Controls on Phosphorus Export from Agricultural Fields to the Aroostook River, Maine - Phase II  | PI   | School of Forest Resources  | 100.00% US Environmental Protection Agency   | \$130,000.00 Nev  |
| dez, Ivan N<br>dez, Ivan A   | Winter Soil Dynamics in a Time of Change: The Missing Link<br>Assessing and monitoring the influce of forest management practices on soil productivity, carbon storage, and conservation in the Acadian Forest Region  | PI<br>Co-PI (Puhlick)  | Lead PI's Department<br>Center for Research on Sustainable Forests  | 100.00% National Science Foundation<br>10.00% Sustainable Forestry Initiative  | \$0.00 Peni<br>\$290,198.00 Peni  |
|  |  |  |   |  |   |
|  | Collaborative research: A mouse's eye view of Rancho La Brea: Assessing millennial-scale community stability using highly-resolved mammal and vegetation food webs<br>PACE Workshop: Integrating Paleo and Community Ecology   | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% National Science Foundation   | \$296,534.00 Con<br>\$49,720.00 Con   |
|  | ARCER: Environmental change and extinction on the mammoth steppe   | PI   | Climate Change Institute  | 100.00% National Science Foundation  | \$284,605.00 New  |
|  | Surviving a mass extinction: Lessons from the post K-Pg fern spike<br>MSB-FRA: Trajectories to extinction: Patterns, causes, and effects of megafaunal population and range dynamics during the last deglaciation  | PI   | Climate Change Institute<br>Climate Change Institute  | 100.00% National Aeronautics & Space Administration<br>100.00% National Science Foundation   | \$332.711.00 Pen  |
| quelyn 🕴   | MSB-HRA: Trajectories to extinction: Patterns, causes, and effects of megafaunal population and range dynamics during the last deglaciation  | PI   | Climate Change Institute  |  |   |
|  |  |  |   |  |   |
|  | Collaborative Research: High-resolution reconstruction of Holocene deglaciation in the southern Ross Embayment   | PI   | Climate Change Institute  | 100.00% National Science Foundation  | \$451,733.00 Pen<br>\$165,146.00 Con  |
| nda S  | Signature of the Last Termination in Maine   | PI<br>PI   | Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science & Education Foundation  | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con   |
| nda S<br>nda G   | Signature of the Last Termination in Maine<br>Collaborative Research: Assessing the Antarctic Ice Sheet from Bryd Glacier  | P1<br>P1<br>P1<br>P1   | Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science & Education Foundation<br>100.00% National Science Foundation   | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con<br>\$200,803.00 Con   |
| nda S<br>nda C<br>nda V<br>nda M   | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Anatractic Les Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PSRFARKERC: Ceological Mixtory Constraints on the Magnitude of Grounding Line Retreat in the Thwaltes Glacier System  | PI<br>PI<br>PI<br>PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science & Education Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>80.00% National Science Foundation  | \$451,733.00 Per<br>\$165,146.00 Cor<br>\$30,000.00 Cor<br>\$200,803.00 Cor<br>\$36,575.00 New<br>\$109,362.00 New  |
| nda S<br>nda C<br>nda V<br>nda M<br>nda F  | Signature of the Last Termination in Maine<br>Collaborative Research: Assessing the Antarctic Ice Sheet from Bryd Glacier<br>When was the Last Glacid Maximum in the South Atlantic?<br>MSPLR.NECIC. Geological History Constraints on the Magnitude of Grounding Line Retreat in the Thwaites Glacier System<br>Response of the Antarctic Ice Sheet on the last great global warming  | PI<br>PI<br>PI<br>PI<br>PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science & Education Foundation<br>100.00% National Science Foundation<br>00.00% National Geographic Sciency<br>80.00% National Science Foundation<br>50.00% National Science Foundation   | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con<br>\$200,803.00 Con<br>\$36,575.00 New<br>\$109,362.00 New<br>\$382,268.00 New  |
| nda S<br>nda C<br>nda \<br>nda P<br>nda P<br>nda T   | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Anatractic Les Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PSRFARKERC: Ceological Mixtory Constraints on the Magnitude of Grounding Line Retreat in the Thwaltes Glacier System  | PI<br>PI<br>PI<br>PI<br>PI<br>PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science & Education Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>80.00% National Science Foundation  | \$451,733.00 Per<br>\$165,146.00 Cor<br>\$30,000.00 Cor<br>\$200,803.00 Cor<br>\$36,575.00 Nex<br>\$109,362.00 Nex<br>\$382,268.00 Nex<br>\$283,154.00 Rei<br>\$263,154.00 Rei  |
| nda S<br>nda Q<br>nda N<br>nda M<br>nda P<br>nda T<br>nda S  | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Antarctic Ice Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PRFNR HRSE: Ceological History, Contraints on the Magnitude of Grounding Line Retreat in the Thwates Glacier System<br>Response of the Antarctic Ice Sheet to the last great global warming<br>The Last Glacial Maximum and Termination in the South Atlantic region, derived from mountain-glacier records in the Falkland Islands: A test of mechan<br>Southern context for the WASD Divide ice core   | P1<br>P1<br>P1<br>P1<br>P1<br>P1<br>P1<br>P1   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation  | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con<br>\$36,575.00 New<br>\$109,362.00 New<br>\$382,268.00 New<br>\$283,256.00 New<br>\$382,268.00 New<br>\$283,154.00 Rejt<br>\$399,895.00 Pen   |
| nda S<br>nda Q<br>nda V<br>nda M<br>nda F<br>nda T<br>nda S<br>, Cynthia F   | Signature of the Last Termination in Maine<br>Colaborative Research. Assessing the Antarctic (ce Sheet from Bryd Glacier<br>When was the Last Glacid Maximum in the South Aflantic?<br>PMFP ANRCE: Ceological History Constraints on the Magnitude of Grounding Line Retreat in the Thwaites Glacier System<br>Response of the Antarctic (ce Sheet to the last great global warming<br>The Last Glacid Maximum and Termination to the South Aflantic region, derived from mountain-glacier records in the FalkMand Islands: A test of mechan<br>Southern context for the WAS Divide Ice core<br>Retinning Resuse and Realiscence in Depleted Rural Aflancia regio  | PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Senator George J. Mitchell Center   | 100.00%. National Science Foundation<br>100.00%. Comer Science Foundation<br>100.00%. National Science Foundation<br>100.00%. National Science Foundation<br>50.00%. National Science Foundation<br>50.00%. National Science Foundation<br>50.00%. National Science Foundation<br>70.00%. National Science Foundation  | \$451,733.00 Per<br>\$165,146.00 Cor<br>\$30,000.00 Cor<br>\$36,575.00 New<br>\$109,362.00 New<br>\$382,268.00 New<br>\$263,154.00 Rej<br>\$399,895.00 Per<br>\$85,738.00 New   |
| nda S<br>nda G<br>nda V<br>nda M<br>nda F<br>nda T<br>nda S<br>r, Cynthia F<br>r, Cynthia T  | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Antarctic Ice Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PRFNR HRSE: Ceological History, Contraints on the Magnitude of Grounding Line Retreat in the Thwates Glacier System<br>Response of the Antarctic Ice Sheet to the last great global warming<br>The Last Glacial Maximum and Termination in the South Atlantic region, derived from mountain-glacier records in the Falkland Islands: A test of mechan<br>Southern context for the WASD Divide ice core   | PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>Co-PI (MacRae)<br>PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% Comer Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation  | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con<br>\$36,575.00 New<br>\$382,563.00 New<br>\$382,563.00 New<br>\$382,563.00 Pen<br>\$89,985.00 Pen<br>\$85,738.00 New<br>\$143,000.00 New  |
| nda S<br>nda C<br>nda V<br>nda M<br>nda F<br>nda T<br>nda S<br>; Cynthia T<br>; Cynthia U<br>; Cynthia U<br>; Cynthia U  | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Antarctic Ice Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PSTR MRSEC. Ceological History: Contraints on the Magnitude of Grounding Line Retreat in the Thwates Glacier System<br>Response of the Antarctic Ice Sheet to the Last great global warming<br>The Last Glacial Maximum and Termination in the South Atlantic region, derived from mountain-glacier records in the Falkland Islands: A test of mechan<br>Southern context for the WASD hidde ice core<br>Rethinking Reuse and Resilience in Depleted Rural America<br>The Genergian Biol Sciol Wate Records: On Characteria ing the Contaminants in MSW Organics from Different Sources<br>Understanding Climate Resilient Development and Discourse in the Pervious Highhands<br>Bioling a Sustainather Prog and concilcuit of Inder graduet Students within a Multidicispilnary Team   | PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>PI<br>Co-PI (MacRae)<br>PI<br>Co-PI (Saber)  | Climate Change institute<br>Climate Change institute<br>Climate Change institute<br>Climate Change institute<br>Climate Change institute<br>Climate Change institute<br>Climate Change institute<br>Senator George J. Mitchell Center<br>Sustainability Solutions initiative<br>Lead PF3 Department<br>Senator Center J. Mitchell Center  | 100.00% National Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>70.00% National Science Foundation<br>10.00% National Science Foundation   | \$451,733.00 Pen<br>\$165,146.00 Con<br>\$30,000.00 Con<br>\$200,803.00 Con<br>\$36,575.00 Nev<br>\$363,552.00 Nev<br>\$363,542.00 Rej<br>\$363,542.00 Rej<br>\$363,542.00 Rej<br>\$399,855.00 Pen<br>\$143,000.00 Nev<br>\$143,210.00 Rej<br>\$143,955.00 Pen  |
| nda S<br>nda C<br>nda M<br>nda M<br>nda F<br>nda S<br>, Cynthia F<br>, Cynthia U<br>, Cynthia U<br>, Cynthia U   | Signature of the Last Termination in Maine<br>Colaborative Research. Assessing the Antarctic lose Sheet from Bryd Glacier<br>When was the Last Glacid Maximum in the South Allantic?<br>PKTP ANREC: Ceological History, Constraints on the Magnitude of Grounding Line Retreat in the Thwates Glacier System<br>Response of the Antarctic lose Net to the Last great global warming<br>The Last Glacid Maximum and Termination in the South Allantic region, derived from mountain-glacier records in the FallWand Mands: A test of mechan<br>Southern context for the WAG Divide is core<br>Retinologic Resume Relatinces on Depleted Rural America<br>The film egnet Risks of Food Water Recorery, Characterizing the Contaminants in MSW Organics from Different Sources<br>Understanding Charama Relating to Hole South Allancia   | PI   | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>State Change Institute<br>Climate Change Institut | 100.00% National Science Foundation<br>100.00% Comer Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>50.00% National Science Foundation<br>20.00% National Science Foundation<br>20.00% Environmental Research & Education Foundation<br>10.00% National Science Foundation  | \$451,733.00 Pen<br>\$165,146,00 Con<br>\$30,000.00 Con<br>\$200,803.00 Con<br>\$36,575.00 New<br>\$362,265.00 New<br>\$263,154.00 Reje<br>\$399,855.00 Pen<br>\$353,738.00 New<br>\$143,30.00 New<br>\$143,310.00 New<br>\$143,310.00 New  |
| nda S<br>nda C<br>nda V<br>nda M<br>nda F<br>nda T<br>nda S<br>, Cynthia T<br>, Cynthia U<br>, Cynthia E<br>, Cynthia S  | Signature of the Last Termination in Maine<br>Caliborative Research. Assessing the Antarctic Ice Sheet from Bryd Glacier<br>When was the Last Glacial Maximum in the South Atlantic?<br>PSTR MRSEC. Ceological History: Contraints on the Magnitude of Grounding Line Retreat in the Thwates Glacier System<br>Response of the Antarctic Ice Sheet to the Last great global warming<br>The Last Glacial Maximum and Termination in the South Atlantic region, derived from mountain-glacier records in the Falkland Islands: A test of mechan<br>Southern context for the WASD hidde ice core<br>Rethinking Reuse and Resilience in Depleted Rural America<br>The Genergian Biol Sciol Wate Records: On Characteria ing the Contaminants in MSW Organics from Different Sources<br>Understanding Climate Resilient Development and Discourse in the Pervious Highhands<br>Bioling as sustainable Progat mon Circuit Groot Genergian Undergradue Students within a Multidisciplinary Team   | PI<br>Co-PI (Saber)  | Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Climate Change Institute<br>Sendro George J. Mitchell Center<br>Sendro George J. Mitchell Center<br>Sendro George J. Mitchell Center<br>Lead PYD Separtment   | 100.00%. National Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>100.00% National Science Foundation<br>50.00% National Science Foundation<br>100.00% National Science Foundation<br>70.00% National Science Foundation<br>70.00% National Science Foundation<br>10.00% National Science Foundation   | \$451,733.00 Pen<br>\$10,000.00 Can<br>\$200,803.00 Can<br>\$36,575.00 New<br>\$159,362.20 New<br>\$263,515.40 Reje<br>\$399,85.00 Pen<br>\$143,900.00 New<br>\$143,300.00 New<br>\$143,300.00 New<br>\$143,95.00 Pen<br>\$190,540.00 Pen   |
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| enda S<br>enda Q<br>enda N<br>enda N<br>enda P<br>enda P<br>en | Signature of the Last Termination in Maine Collaborative Bearch: Assessing the Artarctic Lice Sheet from Bryd Glacier When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum in the South Atlantic? When was the Last Glacid Maximum and Termination to the South Atlantic edin Growning Line Retreat in the Twattes Glacier System Response of the Artarctic Lice Sheet to the Last great global warning The Last Glacid Maximum and Termination the South Atlantic edin, derived from mountain glacier records in the FalkMand Mands: Attest of mechan Southern context for the WAS Divide Lecore Hast Glacid Maximum and Termination the South Atlantic edin, derived from mountain glacier records in the FalkMand Mands: Attest of mechan Southern context for the WAS Divide Lecore Hast Glacid Maximum and Termination the South Atlantic Bilding Southern context for the WAS Divide Lecore Hast Glacid Maximum and Termination and Discources in the Pervisan Highlands Building Southanic Derived The Atlantic Tool Economy for Undergraduate Students within a Multidisciplinary Team Sating Circular Context Foreign Context Context and Realtince: In the Athvhopcene Improved discussion of natural Infrastructure and capital a Ling orved Lindargin for flood attruation in support of State's "Class Water for Maine" Comparis Discurre Perceptitation and Unicources Into Maxim Maximes In Maxim Sci Discuss Discuss Athvines Contail Heritage Linda Discuss Context Athvines Contail Heritage Linda Discuss Contail Heritage Linda Discuss Context Athvines Contail Heritage Linda Discuss Context Athvines Contail Heritage Linda Discuss Context Athvines Contail Heritage Linda Discus   | р<br>(Co 24 (Saber)<br>р)<br>р)<br>Со 24 (Ranco)<br>р<br>р<br>Со 24 (Ranco)<br>р<br>р<br>р<br>Со 24 (Ranco)<br>р<br>р<br>р<br>Со 24 (Ranco)<br>р<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>р<br>р<br>Со 24 (Saber)<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р<br>р | Climate Change Institute<br>Climate Change Institute<br>Lead P1's Department<br>Sendror George J. Mitchell Center<br>Subject Climate Change Institute<br>Lead P1's Department<br>Lead P1's Department<br>Sendror George J. Mitchell Center<br>Subject Climate Change Institute<br>Lead P1's Department<br>Climate Change Institute<br>Lead P1's Department<br>Climate Change Institute<br>Lead P1's Department<br>Climate Change Institute<br>Climate Change Institute  | 100.00% National Science Foundation<br>100.00% National Science Foundation | 3451,733.00         Pem           3165,146.00         Com           310,000,00         Com           310,200,00         Com           310,210,00         Kom           313,210,00         Kom           314,210,00         Kom           313,25,00         Com           314,25,00         Kom           324,25,00         Kom <t< td=""></t<>  |

| Levesque, Danielle               | NSF NRT: One Health and the Environment   | Co-PI (Teisl)            | Lead PI's Department                                   | 8.00% National Science Foundation                            | \$2,998,066.00 |
|----------------------------------|---|--------------------------|--|--|----------------|
| Lyon, Bradfield                  | Coupled Model Blases in the SST Distribution of the Global Tropics and Their Influence on Climate Change Projections  | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$231.888.00   |
| Lyon, Bradfield                  | Drying Versus Wettening of the East African Climate   | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$120,655.00   |
| Lyon, Bradfield                  | Coupled Model Biases in the SST Distribution of the Global Tropics and Their Influence on Climate Change Projections  | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$506,869.00   |
| Lyon, Bradfield                  | U.S. Drought Intensification and Amelioration on Sub-seasonal Timescales  | PI                       | Climate Change Institute                               | 60.00% US Dept of Commerce                                   | \$330,548.00   |
|                                  |   |                          |  |  |                |
| Mayewski, Paul                   | Collaborative Research: Window into the 40 kyr world from climate records in 1 Maice from the Allan Hills Blue Ice Area   | PI                       | Climate Change Institute                               | 60.00% National Science Foundation                           | \$52,541.00    |
| Mayewski, Paul                   | Collaborative Research: Window into the 40 kyr world from climate records in 1 Maice from the Allan Hills Blue Ice Area   | PI                       | Climate Change Institute                               | 60.00% National Science Foundation                           | \$98,988.00    |
| Mayewski, Paul                   | Collaborative Research: Ultra-High-Resolution Investigation of High Andean Snow and Ice Chemistry To Improve Paleoclimatic Reconstruction and Enhance   | PI                       | Climate Change Institute                               | 75.00% National Science Foundation                           | \$185,436.00   |
| Mayewski, Paul                   | Collaborative Research: Ultra-High-Resolution Investigation of High Andean Snow and Ice Chemistry To Improve Paleoclimatic Reconstruction and Enhance Yr2   | PI                       | Climate Change Institute                               | 75.00% National Science Foundation                           | \$283,455.00   |
| Mayewski, Paul                   | Collaborative Research: Ultra-High-Resolution Investigation of High Andean Snow and Ice Chemistry To Improve Paleoclimatic Reconstruction and Enhance Yr3   | PI                       | Climate Change Institute                               | 75.00% National Science Foundation                           | \$256,216.00   |
| Mayewski, Paul                   | Collaborative Research: Pleistocene/Holocene Climate Reconstruction from a Pamir High Resolution Deep Ice-core  | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$192,717.00   |
| Mavewski, Paul                   | COLLABORATIVE RESEARCH: Pleistocene/Holocene Climate Reconstruction from a Pamir high resolution deep ice-core  | PI                       | Climate Change Institute                               | 51.00% National Science Foundation                           | \$195.688.00   |
| Mayewski, Paul                   | Collaborative Research: Pleistocene/Holocene Climate Reconstruction from a Pamir High Resolution Deep to Core   | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$202,426.00   |
| Mayewski, Paul<br>Mayewski, Paul | Consolvative destation interaction inductive construction non-arainining medication being included being induced and a set of the second and a set of | ri -                     | chinate change institute                               | 100.00% National Science Poundation                          | \$202,420.00   |
| ,                                | ······································  |                          |  |  |                |
| McGill, Brian                    | iDiv contract for Measurment of Blodiversity  | PI                       | Senator George J. Mitchell Center                      | 100.00% German Centre for Integrative Biodiversity Research  | \$52,500.00    |
| McGill, Brian                    | Collaborative Research: ABI Development: Creating a generic workflow for scaling up the production of species ranges  | PI                       | Senator George J. Mitchell Center                      | 100.00% National Science Foundation                          | \$89,963.00    |
| McGill, Brian                    | REMOTE SENSING FOR EPIDEMIOLOGY IN AFRICAN CITIES   | PI                       | Senator George J. Mitchell Center                      | 100.00% belspo   | \$97,912.00    |
|                                  |   |                          |  |  |                |
| MacKenzie, Caitlin               | Conservation Challenges for Tundra Refugia under Climate Change: A Paleoecological Perspective on Subalpine and Alpine Vegetation in Maine  | PI                       | Climate Change Institute                               | 100.00% David H. Smith Conversation Fellowship               | \$108,780.00   |
| Norton, Stephen                  | Evaluating and Predicting Vulnerability for Water Quality Decline in Maine Lakes  | Co-PI (Amirbahman)       | Cooperative Extension                                  | 50.00% US Environmental Protection Agency                    | \$12,304.00    |
| Norton, Stephen                  | EAGER: Evaluating potential for lake water quality decline by partnering with citizen scientists  | Co-PI (Amirbahman)       | Lead PI's Department                                   | 40.00% National Science Foundation                           | \$98,620.00    |
| Olsen. Brian                     | Determining bird and invertebrate food-web connections and use of rockweed in light of commercial harvesting  | Co-PI (Klemmer)          | Lead PI's Department                                   | 50.00% ME Dept of Inland Fisheries & Wildlife                | \$17.883.00    |
|                                  |   |                          |  |  |                |
| Olsen, Brian                     | Collaborative Research: Expanding a National Network for Automated Analysis of Constructed Response Assessments to Reveal Student Thinking in STEM  | Co-PI (Smith)            | Lead PI's Department                                   | 5.00% National Science Foundation                            | \$38,824.00    |
| Olsen, Brian                     | Collaborative Research: Expanding a National Network for Automated Analysis of Constructed Response Assessments to Reveal Student Thinking in STEM  | Co-PI (Smith)            | Lead PI's Department                                   | 5.00% National Science Foundation                            | \$106,441.00   |
| Olsen, Brian                     | Collaborative Research: Expanding a National Network for Automated Analysis of Constructed Response Assessments to Reveal Student Thinking in STEM Yr 5   | Co-PI (Smith)            | Lead PI's Department                                   | 5.00% National Science Foundation                            | \$42,704.00    |
| Olsen, Brian                     | Reconciling multiple stakeholders in rockweed habitats: Science to help achieve intersecting goals of a fishery and coastal wildlife  | Co-PI (Klemmer)          | Sea Grant Program                                      | 45.00% US Dept of Commerce                                   | \$71,945.00    |
| Olsen, Brian                     | Animal use of rockweed habitats in coastal Maine  | PI                       | Lead PI's Department                                   | 50.00% US Dept of the Interior                               | \$108,053.00   |
| Olsen, Brian                     | Assessing the Ecological Effectiveness of Hurricane Sandy Marsh Restoration Activities  | PI                       | Lead PI's Department                                   | 90.00% US Dept of the Interior                               | \$191,161.00   |
|                                  | RII Track-2FEC: Genomic Ecology of Coastal Organisms (GECO) –   |                          |  |  |                |
| Olsen, Brian                     | A Systems-based Research and Training Program in Genome-Phenome Relationships in the Wild   | PI                       | Lead PI's Department                                   | 28.00% National Science Foundation                           | \$1,831,431.00 |
|                                  |   |                          |  |  |                |
| Putnam, Aaron                    | CAREER: The Last Glacial Termination in Interior Asia   | PI                       | Lead PI's Department                                   | 100.00% National Science Foundation                          | \$146,842.00   |
| Putnam, Aaron                    | CAREER: The Last Glacial Termination in Interior Asia   | PI                       | Lead PI's Department                                   | 100.00% National Science Foundation                          | \$149,970.00   |
| Putnam, Aaron                    | CAREER: The Last Glacial Termination in Interior Asia Amend 3   | PI                       | Lead PI's Department                                   | 100.00% National Science Foundation                          | \$153,291.00   |
| Putnam, Aaron                    | Was the Little Ice Age Global?  | PI                       | Climate Change Institute                               | 50.00% National Science Foundation                           | \$394,296.00   |
|                                  |   |                          |  |  |                |
| Rickard, Laura                   | Sensing storm surge: A citizen science approach to measuring storm surge-estuarine interaction in three Maine communities   | Co-PI (Huguenard)        | Cooperative Extension                                  | 49.00% National Science Foundation                           | \$99,994.00    |
| Rickard, Laura                   | NRT: Enhancing conservation science and practice: An interdisciplinary program  | Co-PI (De Urioste-Stone) | School of Forest Resources                             | 7.00% National Science Foundation                            | \$2,998,314.00 |
| Sandweiss. Daniel                | Dating Early Evidence for Warfare in Coastal Peru   | PI                       | Climate Change Institute                               | 80.00% National Geographic Society                           | \$18,478.00    |
|                                  |   |                          |  |  | +              |
| Saros, Jasmine                   | IGERT: Adaptation to Abrupt Climate Change Yr5  | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$446,040.00   |
| Saros, Jasmine                   | IGERT: Adaptation to Abrupt Climate Change  | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$534,449.00   |
| Saros, Jasmine                   | IGERT: Adaptation to Abrupt Climate Change Yr 4   | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$648,736.00   |
| Saros, Jasmine                   | GERT: Adaptation to Abrupt Climate Change Yr 2  | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$649.931.00   |
| Saros, Jasmine                   | IGERT: Adaptation to Abrupt Climate Change Yr 3   | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$649.931.00   |
| Saros, Jasmine                   | Jordan Poul Buoy Project Year 3   | PI                       | Climate Change Institute                               | 100.00% Eriends of Acadia                                    | \$14,965.00    |
| Saros, Jasmine                   | Jordan Pond Buoy Project Year 3   | PI                       | Climate Change Institute                               | 100.00% Friends of Acadia                                    | \$14,969.00    |
| Saros, Jasmine<br>Saros, Jasmine |   | PI                       | Climate Change Institute                               | 100.00% Friends of Acadia<br>100.00% US Dept of the Interior | \$14,969.00    |
|                                  | Predicting the sensitivity of boreal lake ecosystems to climate change  |                          |  |  |                |
| Saros, Jasmine                   | Predicting the sensitivity of boreal lake ecosystems to climate change Yr2  | PI                       | Climate Change Institute                               | 100.00% US Dept of the Interior                              | \$51,205.00    |
| Saros, Jasmine                   | Paleolimnological assessment of high-elevation lakes exceeding critical loads of nitrogen deposition across the Greater Yellowstone Area  | PI                       | Climate Change Institute                               | 100.00% US Dept of Agriculture                               | \$15,000.00    |
| Saros, Jasmine                   | COLLABORATIVE PROPOSAL: MSB-FRA: Alpine aquatic metabolism in the mountain west: emergent impacts of a changing cryosphere  | PI                       | Climate Change Institute                               | 100.00% National Science Foundation                          | \$277,412.00   |
| Saros, Jasmine                   | EHR-Polar DCL 2017: Fostering Interdisciplinarity through Theme-Based Encounters: The Arctic Coupled Systems (ArCS) Theme   | PI                       | Climate Change Institute                               | 40.00% National Science Foundation                           | \$292,086.00   |
| Sorg, Marcella                   | Deve Development Manihesise 2015 2015 of Oniolid Interest in Maine  | PI                       | Margaret Chase Smith Center                            | 100.00% Maine Attorney General                               | \$33,747.00    |
|                                  | Drug Death Monitoring 2015-2016 +\$ Opioid Impacts in Maine   |                          |  |  |                |
| Sorg, Marcella                   | Monitoring Maine Drug Deaths for 2017 and 2018  | PI                       | Margaret Chase Smith Center                            | 100.00% ME Attorney General                                  | \$40,112.00    |
| Sorg, Marcella                   | State Surveillance of Oploid Morbidity and Mortality Yr2  | PI                       | Margaret Chase Smith Center                            | 60.00% US Dept of Health & Human Services                    | \$101,100.00   |
| Sorg, Marcella                   | Maine-Vermont Violent Death Reporting System Yr4  | PI                       | Margaret Chase Smith Center                            | 100.00% ME Attorney General                                  | \$155,438.00   |
| Sorg, Marcella                   | State Surveillance of Opioid Morbidity and Mortality Yr3  | PI                       | Margaret Chase Smith Center                            | 60.00% US Dept of Health & Human Services                    | \$126,103.00   |
| Sorg, Marcella                   | Maine-Vermont Violent Death Reporting System Yr5  | PI                       | Margaret Chase Smith Center                            | 100.00% US Dept of Health & Human Services                   | \$170,976.00   |
| Strong, Aaron                    | From Paleoceanography to Policy: applying historical coastal pH baselines from long-lived shells and skeletons to contemporary shellfish aquaculture (Bowdoin College sub) #1   | Co-PI (Bisson)           | Sea Grant Program                                      | 5.00% US Dept of Commerce                                    | \$50,520,00    |
|                                  |   |                          |  |  |                |
| Strong, Aaron                    | Low pH in the coastal waters of the Gulf of Maine: What are the sources and vulnerabilities to coastal communities?   | Co-PI (Townsend)         | School of Marine Sciences                              | 25.00% US Dept of Commerce                                   | \$199,973.00   |
| Strong, Aaron                    | Improvements to regional monitoring networks and assessment of coastal ocean acidification through the lens of four New England estuaries   | PI                       | School of Marine Sciences                              | 100.00% US Dept of Commerce                                  | \$5,610.00     |
| Strong, Aaron                    | Addressing the mess: developing evaluative methods for group participatory decision support in riverine systems   | Co-PI (Klein)            | Sustainability Solutions Initiative                    | 20.00% US Dept of the Interior                               | \$32,406.00    |
| Strong, Aaron                    | Ageneric predictive model for ocean and coastal acidification thresholds from Long Island Sound to the Nova Scotian Shelf   | PI                       | School of Marine Sciences                              | 100.00% US Dept of Commerce                                  | \$146,375.00   |
| Strong, Aaron                    | Sustainability and seaweed: Competing perceptions, definitions and narratives of sustainability in Maine's rockweed harvest   | PI                       | School of Marine Sciences                              | 100.00% National Science Foundation                          | \$171,046.00   |
| Strong, Aaron                    | Improving waste water management with farmed kelp: dynamical biophysical and socioeconomic feedbacks to efficacy  | Co-PI (Evans)            | School of Marine Sciences                              | 30.00% National Science Foundation                           | \$406,011.00   |
| Strong, Aaron                    | Ocean and coastal acidification education and outreach for community resilience   | PI                       | School of Marine Sciences                              | 40.00% US Dept of Commerce                                   | \$442,305.00   |
| Strong, Aaron                    | An integrative approach to addressing sea lice control in the commercial culture of Atlantic salmon   | Co-PI (Hamlin)           | School of Marine Sciences                              | 10.00% US Dept of Commerce                                   | \$725,365.00   |
| Thomas, Andrew                   | Using remote-sensing and in-situ water quality measurements for siting bi-valve aquaculture facilities - Year 1   | Co-PI (Brady)            | School of Marine Sciences                              | 20.00% US Dept of Commerce                                   | \$106.174.00   |
|                                  |   |                          | School of Marine Sciences<br>School of Marine Sciences |  |                |
| Thomas, Andrew                   | Multi- and hyperspectral bio-optical identification and tracking of Gulf of Maine water masses and harmful algal bloom habitat  | PI                       |  | 60.00% National Aeronautics & Space Administration           | \$266,383.00   |
| Thomas, Andrew                   | Coastal SEES (Track 2), Collaborative Research: Resilience and Adaptation of a Coastal Ecological-Economic System in Response to Increasing Temperature   | PI                       | School of Marine Sciences                              | 15.00% National Science Foundation                           | \$310,470.00   |
| Thomas, Andrew                   | Coastal SEES (Track 2), Collaborative Research: Resilience and Adaptation of a Coastal Ecological-Economic System in Response to Increasing Temperature Yr 2  | PI                       | School of Marine Sciences                              | 15.00% National Science Foundation                           | \$815,282.00   |
| Thomas, Andrew                   | MaricultureMap - Development of a GIS tool to inform mariculture development in Alaska  | PI                       | School of Marine Sciences                              | 100.00% US Dept of Commerce                                  | \$56,825.00    |
| Thomas, Andrew                   | Multi- and hyperspectral bio-optical identification and tracking of Gulf of Maine water masses and harmful algal bloom habitat Yr2  | PI                       | School of Marine Sciences                              | 60.00% National Aeronautics & Space Administration           | \$226,872.00   |
| Thomas, Andrew                   | NERACOOS_2016_2021_Buoys_CODAR_Glider_Nutrients_Satellite_Surveys Yr. 2   | Co-PI (Pettigrew)        | School of Marine Sciences                              | 2.50% US Dept of Commerce                                    | \$811,000.00   |
| Thomas, Andrew                   | Aquaculture Site Prospecting using High Resolution Remote Sensing Imagery   | Co-PI (Brady)            | School of Marine Sciences                              | 19.00% US Dept of Commerce                                   | \$692,216.00   |
|                                  |   |                          |  |  |                |

### CLIMATE CHANGE INSTITUTE – FY 2018 ANNUAL REPORT

Count = 146 \$37,599,760.00