

PROJECT INFORMATION

Lead Principal Investigator	Ross Virginia
Institute	Dartmouth College, Institute of Arctic Studies
Project Title / Grant #	IGERT: Polar Environmental Change (0801490)
NSF Program and Manager	NSFEHR/DGE/IGERT, Dr. Carol Van Hartesveldt
PFS Project Manager	Katrine Gorham

LOGISTICS SUMMARY

This grant supports a graduate program with a field course designed to offer students hands-on research opportunities. Beginning in 2010, up to 12 students and instructors will travel to Greenland each year for coursework.

In 2009, students will complete core introductory courses during the 2009-10 academic year before taking the Greenland course. Six members will travel to Greenland during summer 2009 for planning purposes and will work on curriculum development with Greenlandic colleagues. They plan to spend a few days in Kangerlussuaq and time in Nuuk to meet with faculty at the University and with researchers at the ICC.

In 2010-2012, the approximately four week course will have two distinct parts: a two-week field-study effort; and a two-week exploration of policy issues--specifically the human dimensions of climate change--based from Nuuk, Greenland's capitol. For the research component, students will be grouped into two disciplines: one will focus on terrestrial studies--soil-plant-animal interactions in tundra ecosystems--based from Kangerlussuaq and in collaboration with Eric Post; the other will focus on firn/ice studies based from Summit Station.

For each year of field work, CPS will provide Air National Guard (ANG) flight arrangements to and from Kangerlussuaq, user days and classroom space at the KISS facility, Kangerlussuaq vehicle rentals, commercial airline tickets to and from Nuuk, ANG arrangements to and from Summit, Summit user days, and cold weather clothing for the group traveling to Summit Station. The ANG flights are scheduled in advance, therefore, if the timing of flights does not work, the PI will be responsible for commercial airline tickets. The research team will make all other arrangements and pay for them via the grant.

For the complete CPS online project record for this grant, including science objectives, go to:

http://www.polar.ch2m.com/arlss_reports/arlss_projectsdetail.asp?cbPropNum=0801490

For up-to-date information on the project's schedule, please view the online Greenland calendar

(<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

OUTSTANDING ACTIONS AND NOTES

Issue	Responsibility	Date Due	Date Completed
Review support plan for accuracy and distribute to all field team members	PI	6/25/2010	In progress
Obtain all necessary permits and insurance for fieldwork	PI	6/25/2010	In progress
Visit all hyperlinks and review all documents referred to in the support plan	Entire Field Team	6/25/2010	In progress
Contact the GEOSummit Science Coordination Office (SCO) sco at summitcamp.org regarding your project's plans for the season	PI	6/25/2010	Completed
Note: Passports are required for Air National Guard and international travel. Also, please bring TWO copies of your passport to Greenland with you.	Entire field team	6/25/2010	Okay
Complete Critical Success Factors	PI	6/25/2010	Completed

ALLOCATIONS AND SERVICES

Allocations from Inventory

Quant/Unit	Item
Kanger Work	
1	Satellite Phone
3	Handheld Radios
1	First Aid Kit
2	2-burner Coleman Stoves
2-3	Kitchen Boxes (enough supplies for 9 people)
1	Large Cook Tent
4	2-Person Tent
3	1-Person Tent
Summit Work	
8	Sleep Kits
8	ECW Gear (for Summit work only)
8	Arctic Oven Tents (for Summit work only; if needed, sharing acceptable for students)
3	Folding Tables (setup in req weatherport)
8	Folding Chairs (setup in req weatherport)
1	Overhead Projector (setup in req weatherport)
1	Projector Screen (setup in req weatherport)
3-4	Banana Sleds
4	Shovels
2-3	Firn Saws
4	4x8 Pieces of Plywood
1	Arctic Oven Tent (for snowpit site)
1	GPS
2-3	VHF radios

For more information on satellite phones, radios, manuals and other field communications support, please visit the CPS communications Web site at <http://www.polar.ch2m.com/>.

Other Services

Service	Comments
Kanger Work	
User days Kangerlussuaq	
ANG travel NY-Kanger-NY	
Cargo Services	ANG transport of cargo NY-Kanger-NY
Truck Rentals	CPS has made truck rental arrangements for the field team. The following dates have been reserved: 7/11 to 7/22, 1 truck 7/20 to 7/22, 2 trucks 7/29 to 8/8, 1 truck 7/29 to 8/1, 2 trucks 8/7, 2 trucks 8/20 to 8/21, 1 truck
Lab Space at the KISS building	Lab space will be allocated at the KISS building. This area will include access to bench space and sink/water. The researchers acknowledge that this will be shared space and it will be necessary to work around other researchers who may also be using this area.
Storage Space in Kanger	The researchers will be assigned a location, either at the KISS building or CPS warehouse, to store their field equipment and collected soil samples while the field team is in Nuuk.

Commercial Air Travel Kanger to Nuuk	<p>CPS will purchase commercial air tickets for travel from Kanger to Nuuk the following participants:</p> <p>Ross Virginia Julia Bradley-Cook Lauren Culler Laura Levy Gifford Wong Chris Polashenski Simone Whitecloud Kaitlin Keegan</p>
Commercial Air Travel Nuuk to Kanger	<p>CPS will purchase commercial air tickets for travel from Nuuk to Kanger for the following participants:</p> <p>Ross Virginia Julia Bradley-Cook Lauren Culler Gifford Wong Chris Polashenski Simone Whitecloud Kaitlin Keegan Lenore Grenoble</p>
Summit Work	
User days Summit, including meals	<p>The researchers will sleep in tents provided by CPS. The CPS team will provide the researchers with ECW gear and sleep kits.</p> <p>Personnel will use the Big House facilities for meals and observe regular meal times. They should notify the camp manager and chef if they plan to eat outside normal meal times. Any special diets or food allergies should be reported to the chef upon arrival at Summit. If possible, the science group can send an early email to manager at summitcamp.org to prep the cook for special diet requirements.</p>
ANG travel Kanger-Summit-Kanger	
Cargo Services	ANG transport of cargo Kanger-Summit-Kanger
Heated Desk/Presentation Space	<p>The researchers will be provided with heated desk and presentation space. This space will primarily be used for lectures and discussions, as well as computer work area. Space will be allocated in the rec weatherport facility, which will be converted to meet the researchers' needs. The researchers acknowledge that this is a shared space and they must work around others who may need access to the area.</p>
Access to Big House Freezer Trench	<p>The researchers will use the Big House freezer trench for storage of snow samples. Prior to accessing the trench, the researchers agree to review the relevant AHA with the Camp Manager (Ken Jessen).</p>
Snow Pit Work	<p>The researchers will work at the already existing Hawley/Wong two meter snow pit that was established during mid-June 2010. The site is east of the main camp approximately midway to the bamboo forest (approximate location indicated in Figure 1, Appendices). The site coordinates are N 72 34' 40.9" W 38 26' 41.8"</p>

	Additional snow pits will be dug at a location to be decided. All snow disturbances will be backfilled upon completion. GPS coordinates will be recorded and provided to the Summit Project Manager (Katrine Gorham) and Science Techs.
	The researchers will travel to/from the pit sites by foot.
Safety protocols	The researchers will adhere to all safety protocols outlined in the Activity Hazard Analysis (AHAs). This includes reading and signing off on relevant AHAs prior to completing tasks. Additionally, the researchers will adhere to the established clean air protocols and travel policies.

LOCATION INFORMATION

Please visit <http://www.polar.ch2m.com/> and navigate to the Greenland menu for en route and location-specific Greenland information. Prior to deployment, your entire field team should be familiar with the content of the *Greenland Guide* and, if traveling to Summit, with the guidelines provided in the *Summit Users' Guide*. Both are available electronically via our Web site's Greenland menu.

CARGO AND CUSTOMS

All cargo required for your project should arrive in Scotia, NY, **no later than 2 weeks prior** to the desired northbound Air National Guard (ANG) flight, must be entered into our online Cargo Tracking System, and must be properly registered with Customs.

For the most current ANG flight schedule go to <http://www.polar.ch2m.com/> and navigate to Greenland > Calendars/Schedules.

If you are a **new user** requiring access to the Cargo Tracking System, contact [Jason Buenning](#).

(If you need **technical support** with the Cargo Tracking System, contact [Mike Dover](#) .

Customs instructions are available on our Web site at <http://www.polar.ch2m.com/> (go to Greenland > Customs). More information is available via the *Greenland Guide*, under Greenland on the CPS site.

The following is our current understanding of your overall cargo requirements:

Items	Weight (lbs)	Cube (cu ft)
Final Destination Summit	---	---
(4) bottles of dimethyl phthalate	50	3.8
Hardigg	170	10.6
(2) Ice Core Box	40	20.2
Final Destination Kanger	---	---
(3) LiCor System 1	93	7.2
(3) Cooler	75	10.2
Case	25	2.5
Field Pack	30	7.3
Food Box	35	2.3
Large Duffle (inflatable raft)	70	9.0
Case	15	4.0
Medium Duffle	35	4.5
Plastic Barrel	40	5.4
(2) Plastic Barrel (food)	80	13.6
(4) Plastic Tub (food)	160	36

(7) Field Pack	210	31.5
(7) Duffle/Day-Pack	140	14.0
TOTAL	1268	182.1

SUPPORT SCHEDULE

Approx Date	Location	Activity
7/10/10	Kangerlussuaq	Culler and Bradley-Cook arrive in Kanger via commercial air.
7/19/10	Kangerlussuaq	Field team of six (Virginia/Keegan/Levy/Wong/Whitecloud/Albert) arrive in Kanger via ANG.
7/23/10	Summit	Field team of eight (Virginia/Keegan/Levy/Wong/Whitecloud/Albert/Culler/Bradley-Cook) fly from Kanger to Summit via ANG.
7/28/10	Kangerlussuaq	Kelly, Ayres, and Polashenski arrive in Kanger via commercial air.
7/29/10	Summit	Field team of eight (Virginia/Keegan/Levy/Wong/Whitecloud/Albert/Culler/Bradley-Cook) depart Summit to Kanger via ANG.
7/30/10	Kangerlussuaq	Albert departs Kanger for NY via ANG.
8/8/10	Nuuk	Grenoble arrives in Nuuk via commercial air.
8/9/10	Kangerlussuaq	Kelly and Ayres depart Kanger via commercial air.
8/9/10	Nuuk	Field team of eight (Virginia/Keegan/Levy/Wong/Whitecloud/Culler/Bradley-Cook/Polashenski) fly from Kanger to Nuuk.
8/14/10	Nuuk	Levy departs Nuuk via commercial air.
8/20/10	Nuuk	Field team of seven (Virginia/Keegan/Wong/Whitecloud/Culler/Bradley-Cook/Polashenski) depart Nuuk for Kanger via commercial air.
8/21/10	Nuuk	Grenoble departs Nuuk for Kanger via commercial air.
8/22/10	Kangerlussuaq	Field team of eight (Virginia/Keegan/Wong/Whitecloud/Culler/Bradley-Cook/Polashenski/Grenoble) depart Kanger for NY via ANG.

For the most up-to-date information on the project's schedule, please view the online Greenland calendar (<http://www.polar.ch2m.com/> > Greenland > Calendars/Schedules).

FIELD TEAM INFORMATION

Name	Location	Date In	Date Out	Email
Albert, Mary	Kangerlussuaq	07/19/10	07/30/10	mary.r.albert@dartmouth.edu
	Summit	07/23/10	07/29/10	
Ayres, Matthew	Kangerlussuaq	07/27/10	08/09/10	matt.ayres@dartmouth.edu
Bradley-Cook, Laura	Kangerlussuaq	07/10/10	08/22/10	julia.bradley-cook@dartmouth.edu
	Summit	07/22/10	07/29/10	
	Nuuk	08/09/10	08/20/10	
Culler, Lauren	Kangerlussuaq	07/10/10	08/22/10	lauren.e.culler@dartmouth.edu
	Summit	07/22/10	07/29/10	
	Nuuk	08/09/10	08/20/10	
Grenoble, Lenore	Kangerlussuaq	08/21/10	08/22/10	grenoble@uchicago.edu
	Nuuk	8/8/10	8/21/10	
Keegan, Kaitlin	Kangerlussuaq	07/19/10	08/22/10	kaitlin.keegan@dartmouth.edu
	Summit	07/23/10	07/29/10	
	Nuuk	08/09/10	08/20/10	
Kelly, Meredith	Kangerlussuaq	07/28/10	08/09/10	meredith.a.kelly@dartmouth.edu
Levy, Laura	Kangerlussuaq	07/19/10	08/9/10	laura.levy@dartmouth.edu
	Summit	07/22/10	07/28/10	
	Nuuk	08/09/10	08/14/10	
Polashenski, Christopher	Kangerlussuaq	07/28/10	08/22/10	christopher.m.polashenski@dartmouth.edu
	Nuuk	08/09/10	08/20/10	

Virginia, Ross	Kangerlussuaq Summit Nuuk	07/19/10 07/23/10 08/09/10	08/22/10 07/29/10 08/20/10	ross.a.virginia@dartmouth.edu
Whitecloud, Simone	Kangerlussuaq Summit Nuuk	07/19/10 07/23/10 08/09/10	08/22/10 07/29/10 08/20/10	simone.whitecloud@dartmouth.edu
Wong, Gifford	Kangerlussuaq Summit Nuuk	07/19/10 07/23/10 08/09/10	08/22/10 07/29/10 08/20/10	gifford.wong@dartmouth.edu

PROJECT CONTACT INFORMATION

Research Team

Role	Name	Email	Phone / Fax
Co-PI	Mary Albert	mary.r.albert@dartmouth.edu	603 646.0277 /
Co-PI	Ian Baker	ian.baker@dartmouth.edu	603 646.2184 /
Co-PI	Nathan Duthu	n.bruce.duthu@dartmouth.edu	603 646.9028 /
Co-PI	Xiahong Feng	xiahong.feng@dartmouth.edu	603 646.1712 /
Principal Investigator	Ross Virginia	ross.a.virginia@dartmouth.edu	603 646.0192 /603 646.1682

CPS Team Members

Contact for	Name	Email	Primary Phone
Summit science planning & support	Katrine Gorham	Katrine@polarfield.com	Denver: 303.349.2884
Greenland science planning & support	Susan Zager	Susan@polarfield.com	Denver: 720.320.6159
Greenland science planning & support	Robin Abbott	Robin@polarfield.com	Denver: 303.748.8507
Kangerlussuaq base operations	Kathy Young	Kathy@polarfield.com	Denver: 720.320.6160 Greenland: 011.299.524218
Scotia (Stratton Air Base) operations & customs	Earl Vaughn	Earl.Vaughn@gmail.com	Scotia cell: 518.605.0979
Sat phones & comms	Roy Stehle	Roy.Stehle@sri.com	Menlo Park: 650.859.2552
Remote Medical (kits & service) and Medical/Dental Clearance (PQ)	Robbie Score	Robbie@polarfield.com	Denver: 303.906.0093

CPS Offices

Denver	Kangerlussuaq	Scotia
Polar Field Services 8110 Shaffer Parkway Suite 150 Littleton, CO 80127 Tel: 303.984.1450/1439 Fax: 303.984.1445	CH2M HILL Polar Services Attn: Name of Employee/Researcher Postboks 1015 DK-3910 Kangerlussuaq, Greenland Tel: 011.299.841598 Fax: 011.299.841599	Earl Vaughn C/O 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.344.2635 Cell: 518.605.0979 Fax: 518.344.2537

Summit Station

Winter	Summer
Polar Field Services Attn: Name of Employee/Researcher 8110 Shaffer Parkway Suite 150 Littleton, CO 80127 Tel: 303.984.1450/1439 Fax: 303.984.1445	CH2M HILL Polar Services Attn: Name of Employee/Researcher - Summit Station C/O Earl Vaughn 109 th Aerial Port Bldg. 20 Stratton Air Base Scotia, NY 12302-9752 Tel: 518.344.2635 Fax: 518.344.2537

Other

Organization	Internet	Phone
Medical Advisory Service (MAS) (see below for Remote Telemed #)	http://www.medaire.com/corp_medlink.html	Office: 480.333.3771
Summit Science Coordination Office (SCO)	http://www.geosummit.org sco at summitcamp.org	John Burkhart +47 96 82 5011

SAFETY, ENVIRONMENT, HEALTH and PERMITS

Effective January 1, 2010 the Government of Greenland assumed responsibility for the permitting process for research in Greenland. All science teams planning to conduct research in Greenland must complete an **annual application** in order to obtain approval from the Government of Greenland. The application forms are available from the Department of Domestic Affairs, Nature and Environment at <http://www.nanog.gl/expeditions> or by sending an email to [ekspeditioner at gh.gl](mailto:ekspeditioner@gh.gl). Applications are submitted directly through the Department of Domestic Affairs, Nature and Environment. Be advised that a new fee of 4000 DKK has been put in place for permits. For assistance with the application process, contact:

Martin Schiøtz
 Head of Section
 Section of Nature
 Department of Domestic Affairs, Nature and Environment P.O. Box 1614
 3900 Nuuk
 Greenland
 e-mail: [ekspeditioner at gh.gl](mailto:ekspeditioner@gh.gl)

Medical Advisory Service (MAS) Support

If you need medical advice/assistance, do not hesitate to contact Medical Advisory Service (MAS) using the card included with the medical kit or the information below. Be sure that each team member knows where the kit is located and understands how to use the MAS service in the field. For further information on MAS, please visit our Web site <http://www.polar.ch2m.com/> and navigate to Medical>Remote Medical Services/Kits.

MAS 24/7 Telemed Service

Worldwide Phone: 1.480.333.3876
 Fax: 1.480.333.3821
 Member ID: CH2M HILL Polar Services

RISK ASSESSMENT

See Appendix for Risk Factors and Mitigation.

CRITICAL SUCCESS FACTORS

Please list the factors that are most important for the success of your science. We track these factors in order to measure the success of CPS' support. Examples might be the availability of the helicopter or camp gear.

Factors – Kangerlussuaq Work
Dorm space and access to kitchen facilities.
Access to lab space.
Availability of camping gear, vehicles, and communication devices (satellite phone and hand held radios).
Storage space for field gear and samples.
Factors – Summit Work
Availability of ECW gear, sleep kits, and Arctic Oven tents.
Use of the Big House freezer for storage of snow samples.
Availability of a snow pit site that has had undisturbed snow for the past six years.

GOVERNMENT AND PERFORMANCE REPORTING ACT OF 1993 (GPRA)

NSF/OPP requires your help in complying with the Government Performance and Reporting Act of 1993 (GPRA). One measure of CPS' performance is a "facility-performance metric" which counts the number of productive days your project has in the field while relying on CPS facilities or support. Please keep track of any "lost days" and report these to us at the end of the season.

APPENDIX

Table 1: Risk factors and mitigation.

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Factor	Mitigation and Control
Heavy lifting/body strains and sprains	-Use proper lifting techniques
Cold Related Injuries-weather	-Wear proper clothing -Appropriate camping gear, insure sleeping bags are adequately rated -Check the forecast before going out of camp/town -Watch the weather while out -Be mindful of hydration, carry sufficient food -Develop and share your travel plans -Have and share an emergency plan for bad weather
Emergency Plan	-Compile a list of emergency contacts for your field team and share it with critical participants including your home institution and CPS. -Share your satellite phone number as a means for others to contact you.
Truck Travel	-Participate in truck training -Do not ride in the bed of the truck -Insure the truck has spare tire and jack for extended trips -Carry survival gear and warm clothes for extended trips -Carry a radio for extended trips
Boat Travel (including raft, kayak, barge, hovercraft, etc.)	-Participate in boat training -Develop a rescue plan -Carry spare parts -Use appropriate PPE (Personal Protection Equipment)/Carry suitable flotation device(s) -Carry emergency equipment -Carry communications system (radio)
Communications	-Carry the appropriate communications system (satellite phone) -Assure your phone and/or radio is fully charged before going out and carry a spare battery.
Foot/ski travel	-Have a communication plan in place (carry a radio) -Have a check out policy in place
Hazardous Materials	-Haz Comm SMS (Safety Management Standard) -Identify items for hazardous material transportation -Review MSDS (Material Safety Data Sheet)
High Altitude	-Participate in high altitude training -Have medical call in service available -Have SAR plan in place -Have oxygen available in high altitude camps -Develop plan to acclimatize -Consult with physician on use of medication for acclimatization
Remote Camp	-Have a remote medical call in service -Have a SAR plan in place -Have a First Aid kit available -Participate in First Aid training- be sure that someone or all field personnel have Basic First Aid training at a minimum -Have a communication/ check-out/check-in plan in place -Keep a camp roster by each radio to be used in conjunction with the check-out/check-in plan -Develop a list of current camp member's training levels and certifications -Maintain back-up equipment and supplies in case of emergency (comms, generators, tents, food) -Maintain an emergency contact list, include all applicable agencies, field team members, provide camp location and description to local

	SAR groups -Develop a plan for general camp operations including camp hygiene and handling human waste -Participate in PLB (Personal Locator Beacon) training -Participate in GPS (Global Positioning System) training
Water – Availability, Potability	-Investigate the use of a filtration system and acquire one if necessary -Carry water in