IRIS Undergraduate Internship Orientation Week
May 24 – May 30, 2015
New Mexico Tech v2.0

Staff:

- Rob Anthony (Colorado State U. & Program Alumnus)
- Sue Bilek (NMT)
- Ronni Grapenthin (NMT)
- Michael Hubenthal (IRIS)
- Dave Love (NM Bureau of Geology)
- Lindsay Lowe Worthington (UNM)
- William McIntosh (NM Bureau of Geology)
- Peter Mozley (NMT)
- Sandra Saldaña (Noble Energy)
- Justin Sweet (IRIS/PIC)

Orientation Assistant:
- Matt Perry (Sandia National Lab)

Special thanks to...
- New Mexico Tech, Eileen Ryan (MRO), and the staff of the IRIS PASSCAL Instrument Center (Eric Mararewicz, Carlos Marrero & Greg Chavez)

Pre-Orientation Assignments

- Intro to UNIX - Please complete the following assignments prior to the orientation. The assignments can be found at the URL below. Log in credentials have been emailed to you directly. [http://moodle.glg.muohio.edu/glgmoodle/login/index.php](http://moodle.glg.muohio.edu/glgmoodle/login/index.php)
  - UNIX Tutorials 1-2: Basics Quiz
  - UNIX Tutorials 3-4: Basics (continued) Quiz
  - UNIX Tutorials 5-6: Text Editing, Shell Scripts

Day 1; Sunday, May 24

Arrival in Socorro: See shuttle schedule

Sedillo Park Picnic Area – Walking distance from Baca Hall
6:00pm Introductions and Welcome Dinner - We have reserved the pavilion near the Fire Station. See the map provided.

Welcome and Introductions/Overview of IRIS Intern Program (MH, RA, SB)
- Introductory activities
- IRIS overview
- Brief history of IRIS Internship Program

Day 2; Monday, May 25

7:15 BREAKFAST @ Fidel Student Services Center

8:00 Vans depart for PIC
IRIS PASSCAL Conference Room
8:15 A Broad Overview of Seismology, Seismometry, & Cutting-edge Research Topics (SB)

9:00 Broadband station overview (DT)

Test Hill Behind PIC
9:30 Station installations in three teams (RA, DT, MP, SB)

1:00 LUNCH @ Fidel Student Services Center

IRIS PASSCAL Conference Room
2:00 PASSCAL Tour (SB)

2:45 Intro to earth structure (SB)
• seismic waves
• reflection, refraction
• travel time plots & interpretation
• gross earth structure

4:00 BREAK

4:15 From IRIS Intern to ABD (RA)
• Realities of research: both as an intern and graduate student
• Selecting a graduate school
• Your brain pays: applying for scholarships and fellowships
• The mental leap from undergraduate to graduate life
• Growing an IRIS internship experience into a PhD

5:15 FREE TIME

MSEC 202 Conference Room
6:30 DINNER & Evening Lecture – Signal in the Noise: Using Microseisms to Investigate Climate Change in Antarctica and Beyond (RA)

Day 3; Tuesday, May 26

7:30 BREAKFAST @ Fidel Student Services Center

8:15 Shuttle leaves for Morning Field Trip - Earth is made of Rocks (DL)
• Socorro Fault
• Quebradas Hike and lunch (3 Miles Easy)

12:00 LUNCH @ windmill

SPEARE Rm 116
2:00 Staying connected during the internship (MH)
• Logging into IRIS.edu
• Message boards
• Blogs
2:30 Earthquakes (SB)
- Location
- Magnitude
- Seismic moment
- Moment tensors
- Elastic rebound
- Relation to plate tectonics
- Focal mechanisms

3:45 BREAK

4:00 Basic Signal Processing w/ MatLab (RA)
- Introduction to Matlab
- Introduction to spectral analysis and filtering

5:00 BREAK

5:30 Vans Depart from Baca for DINNER at "M" Mountain Club along with knocking a few balls at the driving-range.

Day 4; Wednesday, May 27 - Mountain Day. Students need modest hiking gear, jackets. (BM, GS, RG)
7:30 BREAKFAST @ Fidel Student Services Center
8:30 Shuttles leave cafeteria for MRO Tour and Magdalena Mountains Hike
9:15 Magdalena Ridge Observatory Visit (ER)
10:15 Regional Volcanism and Rifting – A Overview from the Magdalena Crest (WM)
11:15 Depart for Copper Canyon Trail
11:30 Out-n-back hike on Copper Canyon Trail
12:30 LUNCH (packed lunch along) and turn back
2:00 Return to NMT

**SPEARE Rm 116**
3:30 Lecture – Real-time GPS integration in earthquake early warning systems (RG)

4:30 FREE TIME IN COMPUTER LAB

5:45 DINNER at the Fidel Center

**MSEC 202 Conference Room**
6:30 Evening Lecture: The Assumptions of Exploration the Salt Problem + What Industry is Looking for in a Geoscientist (SS)
Day 5; Thursday, May 28 -
7:30 BREAKFAST @ Fidel Student Services Center

SPEARE Rm 116
8:30 Seismogram of the Day (SS)

8:45 General Reflection Theory (SS)
   - Define wavefront & ray
   - Snell’s law
   - Law of reflection
   - Rays in velocity model
   - How we design acquisitions
   - Resolution

10:00 BREAK

10:15 Computing tools and tricks (RG)

12:00 Staying connected during the internship (MH)

12:15 LUNCH @ Fidel Student Services Center

SPEARE Rm 116
1:00 An Overview of Common Seismological Techniques (JS)
   • Waveform cross correlation
   • Subspace analysis
   • Tomography
   • Shear-wave splitting
   • Receiver functions

2:00 BREAK

2:15 Depart for Field Experiment at Loma Blanca fault site in the Sevilleta (SS, PIC, LW, PM)
Sunset: 8:11 PM

8:00 DINNER at (Socorro Springs)

9:00 - 11:00 Games, etc.

Day 6; Friday, May 29

7:30 BREAKFAST @ Fidel Student Services Center

SPEARE Rm 116
8:15 Seismogram of the Day (LW)
8:30 Introduction to Exploration Seismic Processing (LW)
- Shot gather
- Static shifts
- Sort by CMP
- Semblance
- Normal Move Out
- Brute Stack
- Migration
- Depth conversion
- Brute Stack

10:00 Break

10:00 Staying connected during the internship (MH)

10:30 Composition of a Seismogram: Processing BB data in Matlab (RA)
- Source function
- Elastic response function (green’s function)
- Instrument response
- Activity
  - Quietest BB installation
  - Estimate magnitude of an earthquake

12:00 Lunch @ Fidel Student Services Center

SPEARE Rm 116
1:00 Workup of Reflection Data (LW, MP)

3:00 Break

3:15 Maximizing your internship experience (RA/MH)
- Be self-reflective; Develop a plan of action, Maintain & monitor the plan, Evaluate the plan
- Viewing the short-term and long-term benefits of the IRIS internship
- Common pitfalls in research experiences
- Tips for a productive internship
- Presenting your research clearly

5:00 BREAK

San Lorenzo Canyon
5:30 Depart For Evening cookout, bonfire and party (All Invited)

6:30 Career Panel/Dinner
  Lindsay Lowe Worthington - UNM
  Nedra Bonal – Sandia National Lab
  Sandra Saldana – Noble Energy
  Ronni Grapethin - NMT

Day 7; Saturday, May 30 – Breakfast and Depart

Airport runs - TBA

Post Orientation Survey - Sent via email