

## 10/28/10 – NCAR Careers in Science

1. AMS officers covered preliminaries, and announced information about the calendar photos.
2. Speakers:
  - A. Mike Daniels – Computer Engineer, started NCAR at the age of 19 years. He was a text-based programmer and wrote software. He is now a manager.
  - B. Alison Rockwell – Education
  - C. Salizar—Outreach Management.
  - D. Karen Kosiba—Worked in Vortex2 and went to Purdue University. Currently works for the Center for Severe Weather Research.
  - E. Justin Walker—Radar technician and DOW operator. He has forecasted for hurricanes and worked with tornadoes since 2005.
  - F. Pay—Radar Engineer, electrical engineer major. She has storm chased for 5 years and now works for NCAR in designing radar.
  - G. Others from DOW team [I forgot some of the other names, so just fill them in].
3. The National Center of Atmospheric Research is centered in Boulder, Colorado. The fields of study include: atmospheric patterns, climate processes, ocean systems, air chemistry, and severe weather.
4. NCAR builds measurement towers most notably in Owens Valley, California.
5. They fly instrument airplanes such as the EOL C-130 and EOL G-5.
6. Projects undertaken by NCAR include GOTEX, IDEAS, EPIC, DYCOMS II, ACE, TOPSE, INDOEX, WIFE, SHEBA, ACE-1, SCM, BASE, etc.
7. Their 3-word philosophy is: “Manage, Develop, Maintain.”
8. S-Pol Radar studies typhoons, ELDORA studies 3D wind fields, and high frequency radar examines cloud physics.
9. NCAR does projects with NOAA (e.g. NOAA N42RF—the development of more advanced displays.)
10. NCAR spans numerous job fields including but not limited to: pilots, mechanics, optical/RF/Electronics Engineers, Radar scientists, software engineers, electronics techs, mechanical engineers, computer programmers, forecasters, etc.
11. NCAR asks for students to work with them to increase diversity and opportunity. Some students visit NCAR for educational purposes.
12. SOARS—Significant Opportunities in Atmospheric Research. Primarily for transition students from undergrads to grads. You **do not have** to be a science major to partake in the program, for other opportunities in SOARS do exist. “Be ready for a culture shock! Be ready for it, but be ready to appreciate it.”
13. Summer undergraduate internships are available from NCAR along with numerous computing internships. <http://www.eo.ucar.edu> for more information.
14. Paul Sirvatka announced a field campaign in 2011, where the staff needs 15 students. They can be looked up on facebook, twitter, or youtube.
15. Paul Sirvatka announced the storm chasing meeting for December 3<sup>rd</sup>. The DOW might come to COD and help with Paul Sirvatka’s class regarding radars (Mesoscale meteorology).
16. IDEAS project in 2012 using C-130. Not been approved yet, but is in the planning stage.

17. ASP (Advanced Science Program) is excellent for Ph. D's.
18. DOW—Doppler on Wheels.
  - A. Fundamental Questions: What is inside a tornado? What causes a tornado?
  - B. "In-situ" measurements are rare due to hostile environment.
  - C. The problems with damage—intensity inferred from damage, integrated –crude, TOTO: TOTO Tornado Observatory (1970s.)
  - D. Antenna focuses microwaves at clouds, pulse of microwaves bounces off raindrops, echoes are measured. DOW 7 and DOW 5 are used. They also used Dual Polar and Dual Frequency. What type of precipitation is present?
  - E. Resolution is 1 km.
  - F. The DOW shows reflectivity and Doppler velocity.
  - G. Vector winds are the most needed when studying tornado velocities due to complexity. They show divergence, rotation, etc.
  - H. Rapid-Scan Phased-array DOW—faster scanning and mobile.
    1. Six elevations scanned at once
    2. Full volume updates every 7 seconds
    3. 50 or 25 meter gate spacing
    4. 0.8-0.9 degree beam width
  - I. DOW experiments with tornadoes as well as hurricanes, microbursts, and fires.
  - J. VORTEX2
    1. NSF and NOAA supported with \$12 million.
    2. Objectives: Scientific exploration, application of basic scientific knowledge. We need better warnings. Average lead time is 13 minutes and FAR is approximately 80%.
    3. There were 11 mobile radars total in VORTEX2, each assigned specific tasks.
    4. The NSSL, Canadian Met. Service, and CSWR fielded 13 instrumented vehicles.
    5. 24 sticknets from TTU, 16 tornado pods from CSWR, and 2 pods with CU/U of IL disdrometers (measurers of precip. Type.) Photogrammetry—damage surveys, and they also document storm structure, and link radar data with storm structure.
    6. Choreography: 50 scientific vehicles, 80 separately placed instruments, and 120 scientists and crew. Summary: "40,000 km were covered, 10,000 hotel rooms were used."
    7. Data collected in 44 supercells and 25 tornadoes, most notably the Goshen, Wyoming tornado.
  - K. DOW was used in Hurricane Ike and discovered sub kilometer hurricane boundary layer rolls.
  - L. Afterwards, the DOW was shown outside COD