Member Representatives

Rick Anthes

5 October 2011
Rick’s status
AS YOU MAY KNOW, I’LL RETIRE IN A FEW WEEKS BUT YOU BETTER NOT THINK THAT I’M A LAME DUCK NOW!
2011 AGU Edward A. Finn III Award

JARVIS MOYERS (1944-2011)

For an individual who personifies the Union’s motto “unselfish cooperation in research” through their facilitating, coordinating, and implementing activities

“The most important thing for me has been my role in enabling scientific advances, big or small, to take place…..I especially get pleasure from watching younger people—students and postdocs—develop into mature scientists and contribute to the field. Helping them to succeed has made my whole career satisfying and worthwhile.”
Thanks again to the Board!
Anthes Building Completed

• Under US Green Building Council Review for LEED Gold or Platinum Certification
• Energy Design Modeling Performance (vs. Baseline Code Compliant Bldg)
  – **Ground Source Heat Pump (GSHP) System:**
    • **35.9%** reduction in total annual energy usage
  – **Solar Photovoltaic (PV) System:**
    • Supplies **24%** of total annual energy usage
    • Supplies **37%** of annual electrical energy usage
  – **GSHP + PV Systems combined:**
    • **42.9%** reduction in total annual energy usage
PACUR at Florida State University
19 April 2011
Report given by Greg Hakim this afternoon
SPEC and NCAR Advisory Council
August 16-17, 2011
Report given yesterday by Jim Anderson
NSF Director Subra Suresh Visit
6-7 June 2011
Academic Affiliates
20th Anniversary 4 Oct 2011
Richard Anthes was named president of UCAR by the Board of Trustees on 19 September. Anthes has been director of NCAR since September 1986 and prior to that was head of the center’s Atmospheric Analysis and Prediction Division (now the Climate and Global Dynamics Division) for five years.

Much of his early career was spent at Pennsylvania State University, where he taught and conducted research for a decade. He is author or coauthor of over 90 scientific papers and books and is currently chairman of the Board on Atmospheric Sciences and Climate of the National Academy of Sciences/National Research Council. He holds a Ph.D. in meteorology from the University of Wisconsin.

UCAR board chairman Robert Street comments, “Anthes was chosen after an international search that began last March. There were many highly qualified candidates who received serious consideration. We are fortunate to get a strong leader for UCAR to work with our university constituency in carrying out plans that will extend our basic understanding of the earth’s atmosphere, its oceans, and the complex, related processes that make up the earth system.”

Anthes describes his ambitions for UCAR in upbeat but realistic terms. “As a discipline, the atmospheric sciences are not as well organized and well coordinated as they could be,” he cautions. Paraphrasing John Kennedy, he says he hopes UCAR members will ask not what UCAR can do for them but what they can do together for the atmospheric sciences. In particular, he feels that members’ representatives and others at the universities can play a critical role in advocating the importance of the atmospheric sciences to Congress, other policymakers, educators, and the general public. He intends to spend the next year visiting as many member universities as possible, shaping goals and priorities for UCAR in concert with the community. His concerns embrace scientific, educational, and technological areas.

Scientifically, Anthes sees three important challenges for the discipline in the next few years: understanding climate and global change; basic understanding of mesoscale atmospheric processes, leading to improved weather prediction and severe storm warnings; and protecting traditional disciplinary strengths. “We cannot lose sight of our basic commitments to areas such as atmospheric chemistry, dynamics, oceanography, cloud physics, and solar physics,” he warns.

(Continued)
Since I became President in 1988

• 5 NCAR Directors
• 276 President’s Council meetings
• 4 UCAR Vice Presidents
• 12 Chairs of the Board of Trustees
  – Bob Street
  – James Kimpel
  – Richard Somerville
  – Susan Avery
  – John Snow
  – Lennard Fisk
  – Otis Brown
  – Leo Donner
  – Kelvin Droegemeier
  – Eric Barron
  – Rana Fine
  – Dennis Hartmann
• 20 new UCAR Members
• Foothills Lab and Center Green facilities acquired
• Growth of UCAR-NCAR-UCP staff from 1000 to 1550
• Increase in number of female senior scientists from 2 to 10
Laurel Wilkening, George Benton, Kerry Emanuel, Jeff Kimpel, Bill Gordon, Larry Gates, Dick Orville, Bob Duce, Jack Kelly (Holand and Hart), Bill Rawson (VP F&A), Bob Street (Chair), Rick Anthes, Bob MacQueen (NCAR Acting Director), Dick Reed, Vern Suomi
UCAR Board of Trustees October 2011

Jack Fellows (VP Corporate Affairs, Director UCP), Steve Ackerman, Kerry Cook, Don Wuebbles, Anne Thompson, Rick Anthes, Katy Schmoll, Rich Clark, Ric Porecca, Roger Wakimoto (NCAR Director), Amy Clement, Ken Bowman, Roberta Balstad, Dick Truly, Scott Sternberg, Jerry Melillo, Fred Carr, Mark Abbott, Gene Takle, Maura Hagan (NCAR Deputy Director)
UCAR’s 57 Member Institutions (1988/1960)

University of Alaska
University of Arizona
California Institute of Technology
University of California, Davis
University of California, Irvine
University of California, Los Angeles
University of Chicago
Colorado State University
University of Colorado at Boulder
Cornell University
University of Denver
Drexel University
Florida State University
Harvard University
University of Hawaii
University of Illinois at Urbana-Champaign
Iowa State University
The Johns Hopkins University
University of Maryland
Massachusetts Institute of Technology
McGill University
University of Maine
University of Miami
University of Michigan-Ann Arbor
University of Minnesota
University of Missouri
Naval Postgraduate School
University of Nebraska Lincoln
Nevada System of Higher Education
New Mexico Institute of Mining and Technology
New York University
North Carolina State University
The Ohio State University
University of Oklahoma
Oregon State University
Pennsylvania State University
Princeton University
Purdue University
University of Rhode Island
Rice University
Saint Louis University
Scripps Institution of Oceanography at UCSD
Stanford University
State University of New York at Albany
Texas A & M University
University of Texas at Austin
University of Toronto
Utah State University
University of Utah
University of Virginia
University of Washington
Washington State University
University of Wisconsin- Madison
University of Wisconsin-Milwaukee
Woods Hole Oceanographic Institution
University of Wyoming
Yale University
### UCAR’s 77 Member Institutions (2011/1960)

- University of Alabama in Huntsville
- University of Alaska
- University at Albany, State U of NY
- University of Arizona
- Arizona State University
- Brown University
- California Institute of Technology
- University of California, Berkeley
- University of California, Davis
- University of California, Irvine
- University of California, Los Angeles
- University of Chicago
- Colorado State University
- University of Colorado at Boulder
- Columbia University
- University of Connecticut
- Cornell University
- University of Delaware
- University of Denver
- Drexel University
- Florida State University
- Georgia Institute of Technology
- George Mason University
- Harvard University
- University of Hawaii
- University of Houston
- Howard University
- University of Illinois at Urbana-Champaign
- Iowa State University
- University of Iowa
- The Johns Hopkins University
- University of Maryland
- Massachusetts Institute of Technology
- McGill University
- University of Maine
- University of Miami
- University of Michigan-Ann Arbor
- Michigan State University
- University of Minnesota
- University of Missouri
- Naval Postgraduate School
- University of Nebraska Lincoln
- Nevada System of Higher Education
- University of New Hampshire
- New Mexico Institute of Mining and Technology
- New York University
- North Carolina State University
- University of North Dakota
- The Ohio State University
- University of Oklahoma
- Old Dominion University
- Oregon State University
- Pennsylvania State University
- Princeton University
- Purdue University
- University of Rhode Island
- Rice University
- Rutgers University
- Saint Louis University
- Scripps Institution of Oceanography at UCSD
- Stanford University
- Texas A & M University
- University of Texas at Austin
- Texas Tech University
- University of Toronto
- Utah State University
- University of Utah
- University of Virginia
- University of Washington
- Washington State University
- University of Wisconsin- Madison
- University of Wisconsin-Milwaukee
- Woods Hole Oceanographic Institution
- University of Wyoming
- Yale University
- York University
Top Five Program Achievements

• HIAPER (G-5 research aircraft)
• Community Climate (Earth System) Model
• SOARS
• Radio Occultation (GPS-MET and COSMIC)
• NCAR-Wyoming Supercomputing Center
HIAPER: the NSF/NCAR G-V
A New Observing Platform for Environmental Research

HIPPO

Oct 2005 Member Reps

T-REX 2008

2008
HIAPER History

• 1982—First of several community workshops held to discuss scientific need for mid-size jet
• August 1997 HIAPER Plan submitted to NSB
• December 2001 Contract awarded to Gulfstream
• Dec 1, 2005 First research flight-Stratosphere Troposphere Analysis of Regional Transport-measures correlations between water vapor and ozone
• 2009-2011 HIPPO (HIAPER Pole-to-Pole Observations of Carbon Cycle and Greenhouse Gases Study)
New Science Opportunities

Flight to altitudes up to 51,000 ft
  – opens new studies of the upper troposphere and lower stratosphere

Long range (typically 5000 n mi)
  – makes global-scale observations possible

New instrumentation
  – acquired via a community effort; supports many new measurements

New communications tools and operating procedures
  – Distributed participation in airborne missions by those on the ground
  – Ability to conduct global-scale operations without returning to a home base
Projects Not Possible Before the GV

HIPPO (HIAPER Pole-to-Pole Observations)
  – Global-scale profiles of greenhouse gases
PREDICT (Pre-Depression Investigation of Cloud Systems in the Tropics)
  – Studies of the hurricane genesis region in the Eastern Atlantic
START (Stratosphere-Troposphere Analysis of Regional Transport)
  – Measurements in the UTLS transition layer

(and all of the eleven other projects supported since the GV arrived: All required its unique capabilities)
CO2 profile measured during repeated climbs and descents over the Pacific in a N-S profile. Measurements were made in August 2011 and show clearly the depletion in the Northern hemisphere in summer.

In contrast, high values were encountered in early spring in the N hemisphere.

Next sequence runs over a year, from November through September.

Preliminary data used with permission of S. Wofsy and the HIPPO science team.
This animation shows the seasonal change in CO2 as measured on five circuits (spanning from above the Arctic Circle to below the Antarctic Circle) in flights mostly over the Pacific Ocean.

November-September 2009-2011

Preliminary data used with permission of S. Wofsy and the HIPPO science team.
Community Climate and Earth System Models - A community resource

Over 3,000 sites from 130+ countries
CESM History

• 1980s Community Climate Model (CCM)
• May 1996 First CCM Workshop in Breckenridge
• 1998 Climate System Model Initiative (CSMI)
• 2000 Community Climate System Model (CCSM)
• 2010 Community Earth System Model (CESM)
• June 2011 16th CESM Workshop in Breckenridge
Over 3000 sites from 130 countries

1035 Registered Users of CESM1.0 (since 2010 release)
> 350 Peer-Reviewed Publications (since 2008)
> 380 participants in annual CESM workshops
> 180 applicants for CESM summer tutorial
SOARS
Significant Opportunities in Atmospheric Research and Science

Vision
By the end of the first decade of the next century, SOARS will increase significantly the number of ethnically diverse people in the atmospheric and related sciences, including Earth science, engineering, mathematics and social sciences, at the highest professional and leadership levels.

GOAL
By the year 2000, SOARS will support at least 60 ethnically diverse students in the atmospheric and related sciences, graduate at least 40 of these students with MS degrees, and introduce a significant number of these students into PhD programs in UCAR Member universities.
SOARS—1996-2011

SOARS Protégés 1998
SOARS Highlights

- December 1994-proposal submitted to NSF
- First summer protégés in 1996
- 147 protégés served
- Undergraduate degrees-126 completed, 9 currently enrolled
- Masters Degrees - 58 earned, 17 currently enrolled
- PhD Degrees - 15 earned, 23 currently enrolled
- Estimate that the first 15-years of SOARS will produce 69 PhDs in atmospheric science.  This is 3X number of PhDs earned by all students from underrepresented groups in the 15 years prior to SOARS!
- Received Presidential Award for mentoring in 2001
Exploring the Atmosphere With Radio Occultation—contributions to weather, climate and space weather

COSMIC / FORMOSAT - 3
Profiling the Atmosphere by Radio Occultation
History of GPS-MET and COSMIC

July 1965  Mariner IV mission to Mars
Oct 1991 UNAVCO joins UCAR
Dec 1992  UCAR GPS-MET proposal to NSF
1995-97 GPS-MET -1st RO mission for Earth
1996 Concept of COSMIC originated at meeting in Taiwan
1997  First tech support agreement Taiwan’s NSPO
2001  COSMIC project officially begins
2006April 16 launch six satellite constellation
2011 Over 850 peer-reviewed publications since GPS-MET
GPS/MET Launch
April 3, 1995

Mike Exner (UCAR), Charley Dunn (JPL), Tom Meehan (JPL), ???
Micro-Lab-1

April 16, 1995

The first RO profile from Earth

GPS 0744 UTC 122.00N 078.00W
Radiosonde 1200 UTC 24.70N 074.20W
USAF tropical atmosphere model

John McLucas
Trustee 1987-92
Characteristics of GPS RO Data

- Limb sounding geometry complementary to ground and space nadir viewing instruments
- Global coverage
- Profiles ionosphere, stratosphere and troposphere
- Only observing system from space that can profile the ABL
- High accuracy (equivalent to <1 K; average accuracy <0.1 K)
- High precision (0.02-0.05 K)
- High vertical resolution (0.1 km near surface – 1 km tropopause)
- Only system from space to observe atmospheric boundary layer
- All weather-minimally affected by aerosols, clouds or precipitation
- Independent height and pressure
- Requires no first guess sounding
- No calibration required
- Independent of processing center
- Independent of mission
- No instrument drift
- No satellite-to-satellite bias
- Compact sensor, low power, low cost

All of these characteristics have been demonstrated in peer-reviewed literature.
Operational ECMWF system September to December 2008. Averaged over all model layers and entire global atmosphere. % contribution of different observations to reduction in forecast error.

GPS RO has significant impact (ranked #5 among all observing systems) in reducing forecast errors, despite the small number of soundings.

Courtesy: Carla Cardinali and Sean Healy, ECMWF
22 Oct. 2009
Planning began in 2003
Completed on schedule and within budget
Facility commissioning scheduled to be complete by end of December 2011.
NCAR Computing: What has been

Peak TFLOPs at NCAR
NWSC-1: computing

Peak PFLOPs at NCAR

- Independent of Vendor
  - Expect 30 fold increase in computational capacity;
  - 19 fold increase in # of processor cores.
Criteria for successful programs

- Great idea/vision
- Plan to realize the vision
- At least one full-time champion working for the program
- A committed sponsor(s) and sponsor program manager(s)
- Sufficient resources
- Strong, committed and highly respected leadership of the program
- Excellent program management
- Hard work and perseverance
- Supportive, efficient, agile organizational structure and management support
- Community involvement, constructive external review and advice
- Team of excellent scientists, engineers and support staff
- Willingness among all team members to take acceptable risks, work hard, be painfully honest and transparent, and persevere through the ups and downs.
- Time
- Some luck
Thanks for a great ride!

Even Lame Ducks can fly