(Albarède and van der Hilst, 1999)
Understanding the Earth’s interior requires a synthesis of..

Chemistry and Mineral Physics,
Geodynamics,
Seismology,
Rheology and Material Properties,

Courtesy of M. Wysession
“Blind men and the elephant”
Recognizing the need for more effective communication and understanding between the different disciplines, CIDER’s goal is to provide:

- An intellectual framework for integrated multi-disciplinary research in the geosciences
- The necessary complement to growing infrastructure for data gathering and distribution
- Across-disciplinary educational environment to prepare the next generation of earth scientists
CIDER: A “research incubator”:

- **Working model:** KITP (Kavli Institute for Theoretical Physics, UC Santa Barbara)
  - Programs on particular themes last 4-6 months
  - Typically start with 1-2 weeks tutorials
  - Framework for informal interactions
  - At any given time ~20 participants
  - Each participant commits to stay at least 3 weeks.

- Adapt this model to the unique needs of Geosciences
CIDER ACTIVITIES SO FAR

- CIDER Community Workshop:
  - Marconi Center, CA, May 24-29, 2003
  - 77 participants from 43 institutions (US and foreign)
  - goal: define the scope and format of CIDER

- CIDER’04 Summer Program (4 weeks)
  07/12-08/06/04

- CIDER’06 Summer Program (3 weeks)
  07/17-08/06/06

- CIDER’08 Summer Program (7 weeks)
  06/23-08/08/08

  - Held at KITP, Kohn Hall, UCSB campus
  - funded by NSF/CSEDI, infrastructure provided by KITP
CIDER’04 Summer Program:
“Relating seismological and geochemical heterogeneity in the mantle”

- 4 weeks: July 12 - Aug 6, 2004, at KITP
- Organizing team: L. Kellogg, B. Romanowicz, A. Dziewonski, S. Hart
- first two weeks “lectures and tutorials”: 10 lecturers, 30 junior participants (5 from Europe)
  - Buffett, DePaolo, Dziewonski, Hart, Kavner, Kellogg, Lithgow-Bertelloni, Masters, Romanowicz, Stixrude
- last two weeks “workshop” (12 junior and 12 senior participants)
- Workshop focused on recent discovery of the post-perovskite Transition as well as mixing in the mantle. e.g. Lay et al. (2005);
CIDER’06 Summer Program:

“The nature and dynamics of the earth’s transition zone: a multidisciplinary approach”

- 3 weeks: July 16-Aug 06, 2006, with overlapping:
  - two weeks “tutorial”: 35 grad. Students and post-doc’s
  - two weeks “workshop”: 30 junior and senior scientists


- Workshop themes:
  - “The transition zone: slabs’ purgatory”
  - “Seismic velocity gradients across the transition zone”
  - “Mantle potential temperature”
  - “Mixing- aka Progress towards chaos”

- http://www.deep-earth.org/summer06.html
CIDER’08 Summer Program: “Boundary Layers in the Earth”

- 7 weeks: June 23 – August 10, 2008
- First three weeks “KITP mode”:
  - Overlap with two other KITP programs:
    - “Dynamos”
    - “Climate Physics”
- Middle two weeks: tutorial program for 35 graduate students and post-docs.
  Instructors: Buffett, Dziewonski, Hart, Kavner, Kellogg, CT Lee, J. Li, Liebemann, Manga, Masters, Mukhopadhyay, Romanowicz, Tromp, VanKeken

  Hosted VLAB short course (Wentzcovitch)

- Last 2 weeks: workshop – focused on the following themes:
  - Inner Core Boundary structure and dynamics
  - the Lithosphere Asthenosphere Boundary
  - Towards a new paradigm for global mantle dynamics
  - Mixing in the mantle
CIDER Products

• Presentations at AGU

• Papers published as a result of CIDER interactions

• Proposals written to CSEDI - and some funded!

• Students have gone on to post-doc and faculty positions
CIDER Future Plans

- Community Workshop: May 17-20 2009 at Marconi Center (CA)
  - Expand CIDER activities beyond summer programs?
  - Consider longer term relationship with KITP versus our own home?
  - Consolidate/define relationship with Compres, CIG and other infrastructure programs

- CIDER proposal to be submitted to NSF/CSEDI in Fall’09

- Summer 2010 program in Santa Barbara (proposal to KITP accepted)
Summer’2010 CIDER Program:
“Fluids and volatiles in the Earth’s mantle and core”

- June 6- July 18th, 2010
- 2 weeks of tutorial program (June 27-July 11), overlapping with workshop (July 4-July 18).
- Theme: “Fluids and volatiles in the Earth’s mantle and core”
- Overlaps with KITP program on “The Physics of Glasses”
Possible relations with CIG

- Tutorials within CIDER summer programs
- Science and technical workshops within CIDER framework
- ......
CIDER STEERING COMMITTEE
2003-2007

- D. DePaolo, UC Berkeley, Geochem.
- A. Dziewonski (chair), Harvard, Seismology
- S. Hart, WHOI/MIT, Geochem.
- L. Kellogg, UCD, Geodynamics
- D. Kent, Rutgers, Geomagnetism
- M. Manga, UC Berkeley, Geodynamics
- G. Masters, UCSD, Seismology
- P. Olson, Johns Hopkins, Geodynamics
- B. Romanowicz, UC Berkeley, Seismology
- E. Stolper, Caltech, Geochem.
- D. Weidner, SUNY, Mineral Phys.
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<tr>
<th>Name</th>
<th>Institution</th>
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<tr>
<td>C. Constable</td>
<td>UCSD</td>
<td>Geomagnetism</td>
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<td>D. DePaolo</td>
<td>UC Berkeley</td>
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<td>M. Hirschmann</td>
<td>U. Minn.</td>
<td>Min. Phys/Geoch.</td>
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<tr>
<td>L. Kellogg (Chair)</td>
<td>UCD</td>
<td>Geodynamics</td>
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