

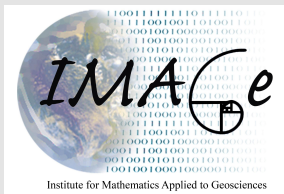
# Institute for Mathematics Applied to Geosciences

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- IMAGE overview
- Theme-of-the year and visitor metrics
- Successes
- Impediments
- Response to Board's advice.



*Supported by NSF*



*IMAGE Advisory Board, Jan 2009*

# IMAGE (at a glance)

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**Mission:** IMAGE brings mathematical models and tools to bear on fundamental problems in the geosciences.

**Origin:** Formed in October 2004 as part of the NCAR re-organization, Numerics group transferred (10/2005).

**Budget:** FY08 2.4M in core funds  $\approx$  300K in external grants.

**Structure:** Science units: Data Assimilation, Numerics, Statistics and Turbulence

**Staff:** 20+ members

administrative and scientific support, software engineers, ladder scientists, post doctoral scientists, visitors and joint appointments (3 ESSL, 2 ISSE).

**Leadership:** Council: Section leads and Scientist 4s, External Advisory Board. An academic department model.

# Theme-of-the-Year

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A year-long series of workshops, visitors and schools that combines mathematical science with an NCAR science topic.

An external co-director helps to lead the TOY.



- *TOY '06 Models for Multi-scale Geophysical Processes*  
J. Tribbia & A. Majda (Courant)
- *TOY '07 Statistics for numerical models*  
S.Sain, M. Fuentes (NCSU) & D. Bingham (Simon Fraser)
- *TOY '08 Geophysical Turbulence: Observations, Computation and Theory* A. Pouquet & K. Julien (CU)
- *TOY '09 Numerical methods*  
A. St-Cyr, N. Flyer, B.C. Low & HOMME group ...

# New venues ... IMAGE and friends

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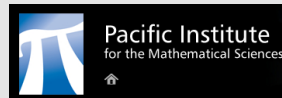
## *Visitors and workshop participants.*

	total	first visit	early career
FY07	120	60	64
FY08	240	92	97

## *External colleagues and students*

total	CMG	DAReS	GSP	TNT
98	28	30	18	22

## *NSF/NSERC Mathematics Centers*



Shared workshops, post docs and summer schools.

## *UWy-NCAR Days*

# IMAGE successes

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*IMAGE, a home for applied mathematics\* at NCAR.*

A destination for the mathematical community and unique in its role of bridging math and geosciences.

*IMAGE, a scientific nexus within CISL*

IMAGE has helped CISL complement its service mission with computational and mathematical science.

*Data Assimilation Research Testbed (DART)*

DART has more than 25 active collaborations supporting more than 10 major models – including WRF and CAM.

*Theme-of-the-Year*

Has brought different kinds of scientists to NCAR and supported early career scientists.

*Recent, strong endorsement by NCAR Directorate*

# Some IMAGE wide challenges

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*Each group's budget is eroded by inflation.*

*TOY is under-funded* Current funding at 70K workshops + 20K visitors is not enough to attract a prominent co-director or share post doctoral visitors with other units or centers.

*Limited software support for community tools and models.* IMAGE/CISL in general lacks software engineering to support innovative community numeric testbeds. e.g. DART, GASPAR, HOMME, MUSE.

*Multidisciplinary teams are harder to form and maintain* Few of us have training in multidisciplinary projects and it is often easier to work within one's domain of expertise.

# Responses to the Board's 2006 report

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## *Overall:*

- Piotr Smolarkiewicz (25%) section head for CMG.
- Pablo Mininni, Scientist 1 (25%) in TNT.  
St-Cyr/Rosenberg collaboration on GASPAR.
- GSP has continued to bring visitors and post docs to NCAR. Awarded two NSF grants.
- DAREs has been successful in external funding to support some DART applications. Partial support from NCAR weather division for DART/WRF interface.

*Strategic Plan:* Late in coming, but drafted!

IMAGE from the very start has been fully integrated into the annual CISL budget planning.

*Post docs:* A high budget priority along with GTP (NCAR-wide) post docs.

*TOY:* Themes have played to section strengths with the recent one including an extensive summer school.

Visibility has been amplified by partnering with Mathematics Institutes.

*Expanding the Umbrella* This is pursued (successfully) at the individual level but IMAGE could do more with organized activities.

TOY 07 featured NCAR modeling groups.

TOY 08 engaged GTP members across NCAR.

TOY 09 will include CISL computer science and climate/weather modelers.



Thank You!

