7/23/2012

Agenda for the Dynamical Core Model Intercomparison Project (DCMIP) and Summer School, NCAR Foothills Lab (FL), Boulder, CO
July/30 – August/10/2012

All lectures will be presented in the FL Large Auditorium (FL-1022). The 1-hr time slots are composed of a 45-50 minute presentations plus a 10-15 minute discussion period.
The suggested topics might be tweaked by the presenter.

Information on the live webcast of all lectures:
http://www.fin.ucar.edu/it/mms/fl-live.htm

Recordings of the lectures and the lecture slides will also be made available on the DCMIP shared workspace: http://earthsystemcog.org/projects/dcmip-2012/

Agenda

optional:
Sunday 7/29/2012

Informal get-together at the Baker Street Pub & Grill near the Best Western Golden Buff Lodge, 1729 28th St., Boulder, CO 80301, starting at 6pm, find us on the patio

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Monday 7/30/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:15-8:50am	Registration and check-in at the Foothills Lab, Cafeteria Atrium, refreshments
8:50-9:20am	**DCMIP organizers** Welcome note, overview of DCMIP and participating models, logistics
9:20-10:20am	**David Randall** (Colorado State University) Overview of a GCM: building blocks dynamics and physics, dry equation sets for dynamical cores: review of the primitive equations, and how to extend them to non-hydrostatic equations, deep and shallow atmosphere approaches, spherical geopotential approximation versus elliptical shapes of the Earth, choices of the prognostic variables
10:20-10:45am	Break, refreshments
10:45-11:45am	**David Stainforth** (London School of Economics and Political Science) Uncertainty & Ensembles, Part I: chaos and nonlinearity, basic issues of how we relate models of nonlinear systems to reality
11:45am-12:30pm	**Sylvia Murphy** (NOAA, Earth System Research Laboratory) Overview of the DCMIP cyberinfrastructure and workspace, demonstrations of its tools, model metadata, Live Access Server (LAS), brief comments about the Earth System Grid
12:30-1:30pm	Lunch break, FL cafeteria
1:30-2pm	**Si Liu (**NCAR Computational & Information Systems Laboratory**)** Use of the NCAR computing resources, how to logon, batch queues, etc.

2-4pm	Hands-on group projects with modeling mentors in smaller meeting rooms
4pm	Bus pickup from the FL lab, transfer to the NCAR Mesa Lab
4:30-6:30pm	Ice-breaker reception at the Mesa Lab, Tree Plaza
6:30pm	Bus pickup from the Mesa Lab, transfer to the Golden Buff hotel

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Tuesday 7/31/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Paul Ullrich** (University of Michigan) Numerical Methods I: Review of spatial (horizontal) discretizations
9:30-10:30am	**David Stainforth** (London School of Economics and Political Science) Uncertainty & Ensembles, Part II: Sources and types of uncertainty, design issues for different types of ensembles (perturbed parameter ensembles (PPEs), multi-model ensembles (MMEs), and initial condition ensembles (ICEs)), pros and cons of ensembles
10:30-11am	Break, refreshments
11am-12pm	**Christiane Jablonowski** (University of Michigan) Model Evaluations I: Structural and parameter uncertainty in dynamical cores, how do we test dynamical cores and full-physics weather and climate models: Overview of the test hierarchy including the Atmospheric Model Intercomparison Project (AMIP) and Aqua-Planet Experiments
12-12:30pm	**Jerry Meehl** (NCAR) Model Evaluations II: Overview of the Coupled Model Intercomparison Project (CMIP5) and its connection to IPCC, the pros and cons of having multi-model ensembles, quality control
12:30-1:30pm	Lunch break, FL cafeteria
1:30-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Wednesday 8/1/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Paul Ullrich** (University of Michigan): Numerical Methods II: Review of temporal discretizations, numerical stability
9:30-10:30am	**Michael Toy** (Colorado State University): Numerical Methods III: Review of vertical coordinates and vertical discretizations
10:30-11am	Break, refreshments
11-11:20am	**OLAM Modeling Mentors: Robert Walko** (University of Miami), **Martin Otte** (Environmental Protection Agency)

	Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**David Stainforth** (London School of Economics and Political Science) Uncertainty & Ensembles, Part III: Ensembles and questions of model exclusion, model weighting and model interpretation more generally, insights from the climateprediction.net experiments, personal perspective: towards seamless predictions across many scales, unified modeling
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Thursday 8/2/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**David Randall** (Colorado State University) Physics-Dynamics Interplay I: How to include moisture, moist equation sets, what are the moisture feedbacks, how do they drive the dynamics?
9:30-10:30am	**David Williamson** (NCAR) Physics-Dynamics Interplay II: How to couple dynamics and physics: grids, physics time steps and update intervals, process-split versus time-split, intrinsic time-scale dependencies in the physics, what are the sensitivities, sensitivities to resolutions
10:30-11am	Break, refreshments
11-11:20am	**UZIM Modeling Mentors: Ross Heikes, Don Dazlich, David Randall** (Colorado State University) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**Mark Taylor** (Sandia National Laboratories) Trends: Review of typical grid resolutions (horizontal + vertical) in GCMs, challenges at high horizontal resolutions, emerging variable-resolution approaches for climate models with regional focus areas, illustrated with examples from the Spectral Element (SE) Community Atmosphere Model (CAM)
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects in smaller meeting rooms
3:30-4:30pm	Parallel session for DCMIP organizers and modeling mentors: Discussion about the vision for DCMIP and the establishment of a virtual dynamical core modeling community, supported via cyberinfrastructure, FL2 Auditorium
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Friday 8/3/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Richard Neale** (NCAR) Physics-Dynamics Interplay III: Which types of physical parameterizations are present in weather and climate models? What are their high-level design philosophies?
9:30-10:30am	**David Randall** (Colorado State University) Physics-Dynamics Interplay IV: What becomes obsolete in non-hydrostatic models and at which scale? What are the pros and cons of superparameterizations? How to think about scale-aware physical parameterizations suitable for models with variable-resolution grids?
10:30-11am	Break, refreshments
11-11:20am	**ENDGame Modeling Mentors: Thomas Melvin, Markus Gross** (U.K. Met Office) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**Judith Berner** (NCAR) Physics-Dynamics Interplay V, and Trends: Principles of stochastic physical parameterizations, what is their promise?
12:25-1:30pm	Pizza lunch, EOL Atrium, first glimpse at the DCMIP intercomparison results
1:30-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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optional:
Saturday 8/4/2012

9am	Bus pickup at the Golden Buff hotel, transfer to Chautauqua Park Hike, final destination NCAR Mesa Lab, catered box lunch at the Mesa Lab
1pm	Bus pickup from the Mesa Lab, return to Golden Buff hotel

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Monday 8/6/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Kevin Trenberth** (NCAR) Model Evaluations III: Overview of re-analysis data sets and their pros and cons for model evaluations
9:30-10:30am	**James Hack** (Oak Ridge National Laboratory) Model tuning I: What are the multitudes of empirical physics tuning parameters in GCMs (examples) and how are the valid ranges determined in practice? Principles of tuning (who does it, what are the physical principles behind it (e.g. energy balances?)), tuning for high resolutions, experiences with ultra-high resolution global

	coupled climate modeling and why tuning alone is not the answer, do we need to re-think how physical parameterizations work?
10:30-11am	Break, refreshments
11-11:20am	**NICAM Modeling Mentors: Hiroaki Miura** (University of Japan), **Ryuji Yoshida** (RIKEN) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**Christiane Jablonowski** (University of Michigan) Model tuning II: Review of filtering operations and diffusive mechanisms in dynamical cores, what are resolvable and unresolved scales?
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Tuesday 8/7/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**James Hack** (Oak Ridge National Laboratory) Emerging computational aspects and challenges for GCMs I: High-performance computing needs for the climate and weather modeling community from the scientific and hardware perspectives, how feasible is the co-design of models and hardware, the interplay between the computational design and performance of atmospheric models (grids, domain decompositions, parallel communication, load balancing), how should/will future GCMs need to be designed
9:30-9:50am	**ICON-MPI-DWD Modeling Mentor**s: **Marco Giorgetta, Levi Silvers** (Max-Planck Institute for Meteorology (MPI)), **Daniel Reinert** (German Weather Service) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
9:50-10:10am	**ICON-IAP Modeling Mentor: Almut Gassmann** (Leibniz-Institute of Atmospheric Physics at the University of Rostock (IAP)) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
10:10-10:40am	Break, refreshments
10:40-11am	**FIM Modeling Mentors: Rainer Bleck** (NOAA Earth System Research Laboratory (ESRL) and NASA Goddard Institute for Space Studies (GISS)), **Tanya Smirnova** (NOAA ESRL), **Shan Sun** (NOAA ESRL) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11-11:20am	**NIM Modeling Mentor**: **Jin Lee** (NOAA Earth System Research Laboratory (ESRL)) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design

11:20am-12:20pm	**Peter Lauritzen** (NCAR) Tracer Advection I: Tracer transport, design philosophies of advection schemes
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Wednesday 8/8/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Ram Nair** (NCAR) Tracer Advection II: Numerical methods for tracer advection schemes
9:30-9:50am	**MCORE Modeling Mentor: Paul Ullrich** (University of Michigan) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
9:50-10:10am	**MPAS Modeling Mentor: William Skamarock, Joseph Klemp, Sang-Hun Park, Michael Duda** (NCAR) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
10:10-10:40am	Break, refreshments
10:40-11am	**IFS Modeling Mentor: Sylvie Malardel** (European Centre for Medium-Range Weather Forecasts) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11-11:20am	**CAM-SE Modeling Mentor: Mark Taylor** (Sandia National Laboratories) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**Richard Loft** (NCAR) Emerging computational aspects and challenges for GCMs II: Some basics on parallel computing (keywords), some history about parallel computing at NCAR and upcoming trends in parallel and high-performance computing, the challenges of massively parallel computing (hardware and software), scalability of GCMs, how to maximize and think about performance
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Thursday 8/9/2012

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-9:30am	**Matthew Norman** (ORNL) Emerging computational aspects and challenges for GCMs III: Some basics on General Purpose Graphical Processing Units (GPGPUs), pros and cons (and personal perspectives) of GPGPUs for atmospheric models, experiences and recommendations from a practitioner's viewpoint
9:30-9:50am	**DYNAMICO Modeling Mentors: Thomas Dubos** (Laboratoire Météorologique Dynamique (LMD)), **Yann Meurdesoif** (Laboratoire des Sciences du Climat et l'Environnement (LSCE)) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
9:50-10:10am	**FV3-GFDL Modeling Mentor: Lucas Harris** (NOAA Geophysical Fluid Dynamics Laboratory (GFDL)) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
10:10-10:40am	Break, refreshments
10:40-11am	**CAM-FV Modeling Mentor: James Kent** (University of Michigan) Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11-11:20am	**Brief overview of the remotely participating models: GEM-yinyang, GEM-latlon, PUMA, and general discussion about dynamical core designs** Design philosophies of the dynamical core, discussion of the scientific reasoning/motivation behind the design
11:20am-12:20pm	**Richard Rood** (University of Michigan) Model Evaluations IV: Model validation and verification
12:20-1:20pm	Lunch break, FL cafeteria
1:20-3:15pm	Hands-on group projects with modeling mentors in smaller meeting rooms
3:15-3:30pm	Break, refreshments
3:30-5pm	Hands-on group projects with modeling mentors in smaller meeting rooms
5:15pm	Bus pickup from the FL Lab, transfer to the Golden Buff hotel

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Friday 8/10/2012: Small-group presentations, including remotely participating groups

Results and Highlights of the Model Intercomparison Project

8am	Bus pickup at the Golden Buff hotel, transfer to NCAR's Foothills Lab
8:30-8:45am	**PUMA: Thomas Frisius** (University of Hamburg, Germany), via screen share from Hamburg
8:45-9am	**ENDGame**
9-9:15am	**MCORE**
9:15-9:30am	**ICON-IAP**
9:30-9:45am	**ICON-MPI-DWD**

9:45-10am	**IFS**
10-10:30am	Break, refreshments
10:30-11am	**GEM-yinyang, GEM-latlon:** Abdesssamad Qaddouri (Environment Canada), via screen share from Canada
11-11:15am	**CAM-SE**
11:15-11:30am	**MPAS**
11:30-11:45am	**FIM**
11:45-12pm	**NIM**
12-1pm	Lunch break, FL cafeteria
1-1:15pm	**UZIM**
1:15-1:30pm	**OLAM**
1:30-1:45pm	**CAM-FV: James Kent** (University of Michigan)
1:45-2pm	**FV3-GFDL**
2-2:15pm	**DYNAMICO**
2:15-2:30pm	**NICAM**
2:30-3pm	Break, refreshments
3-4:15pm	**All:** Open discussion, perspectives of the modeling mentors, question and answer session
4:15-4:45pm	wrap-up and review of DCMIP
5pm	Bus pickup from the FL Lab, transfer to the Mesa Lab
5:30pm-8pm	Farewell BBQ at the Mesa Lab, Tree Plaza
8pm	Bus pickup from the Mesa Lab, transfer to the Golden Buff hotel