# 2018 EnKF workshop program

## Monday 28/05/2018

| | | |
|---|---|---|
| **08:30-8:45:** | **Coffee & registration** | |
| 08:45-09:00: | Welcome (Xiaodong Luo, IRIS, Norway) | |
| 09:00-09:45**:** | **Diagnosis, conditioning and regularization of error covariance matrices in data assimilation**<br>Nancy Nichols<br>University of Reading, UK | Session chair: Alberto Carrassi, NERSC, Norway |
| 09:45-10:15 | **Estimation of model error covariances for nonlinear dynamical systems using Particle Filters and the Expectation-Maximization algorithm**<br>M. Lucini[1,2], P.J Van Leeuwen[1], M. Pulido[1,2]<br>[1]University of Reading, UK; [2]Universidad Nacional del Nordeste, Argentina | |
| 10:15-10:45 | **Shadowing for data assimilation with imperfect models**<br>Bart de Leeuw, Svetlana Dubinkina<br>CWI, Netherlands | |
| **10:45-11:00** | **Break** | |
| 11:00-11:45 | **Relevance of conservation laws for an Ensemble Kalman Filter**<br>Svetlana Dubinkina<br>CWI, Netherlands | Session chair: Geir Evensen, IRIS & NERSC, Norway |
| 11:45-12:15 | **EnKF using selection Gaussian prior**<br>Maxime Conjard**,** Henning Omre<br>NTNU, Norway | |
| **12:15-13:15** | **Lunch** | |
| 13:15-13:45 | **Assimilation onto the unstable subspace and asymptotic properties of Kalman - Bucy filter for zero noise dynamical system**<br>Amit Apte[1], Sreekar Vadlamani[2], Anugu Sumith Reddy[1]<br>[1]ICTS, India; [2]Lund University, Sweden | Session chair: Patrick Raanes, IRIS, Norway |
| 13:45-14:15 | **Chaotic dynamics and the role of covariance inflation for reduced rank Kalman filters with model error**<br>Colin Grudzien[1]**,** Alberto Carrassi[1], Marc Bocquet[2]<br>[1]NERSC, Norway; [2]CEREA-ENPC, France | |
| 14:15-14:45 | **An adaptive scheme for MCMC in infinite dimensions**<br>Sreekar Vadlamani[1,2], Jonas Wallin[1]<br>[1]Lund University, Sweden; [2]TIFR-CAM, India | |
| **14:45-15:00** | **Break** | |
| 15:00-15:30 | **Revised Implicit Equal-Weights Particle Filter**<br>Jacob Skauvold[1]**,** Peter Jan van Leeuwen[2], Javier Amezcua[2]**,** Jo Eidsvik[1]<br>[1]NTNU, Norway; [2]University of Reading, UK | Session chair: Rolf Lorentzen, IRIS, Norway |
| 15:30-16:00 | **The variational mapping particle filter**<br>Manuel Pulido[1,2], Peter Jan Van Leeuwen[1]<br>[1]University of Reading, UK; [2]Universidad Nacional del Nordeste, Argentina | |
| 16:00-16:30 | **Localisation in particle filters: methods comparison and improvements**<br>Alban Farchi, Marc Bocquet<br>CEREA-ENPC, France | |
| **16:30-17:20** | **Poster session** | |
| **18:00-** | **Boat trip to Cornelius (boarding at Dreggekaien, Skur 8).** | |
| **19:00** | **Dinner** | |

*Invited talks in **blue** color, speakers' names underlined, and titles in **boldface**

# 2018 EnKF workshop program

## Tuesday 29/05/2018

| | | |
|---|---|---|
| 08:30-09:15 | **Coupled data assimilation for the atmosphere-land surface-subsurface models**<br>H.J. Hendricks Franssen[1], W. Kurtz[1], H. Zhang[1], P. Shrestha[2], D. Baatz[1], C. Simmer[2], S. Kollet[1], H. Vereecken[1], P. Shrestha[2]<br>[1]Forschungszentrum Julich GmbH & Centre for High Performance Computing in Terrestrial Systems, Germany; [2]University of Bonn, Germany | Session chair: Xiaodong Luo, IRIS, Norway |
| 09:15-09:45 | **Ensemble based and implicit cross-correlations in coupled data assimilation**<br>Patrick Laloyaux[1], Sergey Frolov[1], Massimo Bonavita[1], Benjamin Ménétrier[2]<br>[1]ECMWF; [2]Météo France | |
| **09:45-10:00** | **Break** | |
| 10:00-10:30 | **Data assimilation for a multi-compartment porous media model for blood flow in the brain**<br>Geir Nævdal[1], Erlend Hodneland[2], Ove Sævareid[1]<br>[1]IRIS, Norway; [2]CMR, Norway | Session chair: Randi Valestrand, IRIS, Norway |
| 10:30-11:00 | **Adaptive covariance inflation in the EnKF by Gaussian scale mixtures**<br>Patrick N. Raanes[1,3], Marc Bocquet[2], Alberto Carrassi[1]<br>[1]NERSC, Norway; [2]CEREA-ENPC, France; [3]IRIS, Norway | |
| 11:00-11:30 | **Ensemble data assimilation on non-conservative adaptive moving mesh**<br>Colin T. Guider[1], Ali Aydogdu[2], Chris K.R.T Jones[1], Alberto Carrassi[2]<br>[1]University of North Carolina, USA; [2]NERSC, Norway | |
| **11:30-12:30** | **Lunch** | |
| 12:30-13:00 | **Towards assimilation of ExoMars trace gas orbiter observations into the LMD Mars GCM using the LETKF**<br>R. M. B. Young[1], E. Millour[1], F. Forget[1], T. Navarro[1,2]<br>[1]Sorbonne Université, France; [2]UCLA, USA | Session chair: Laurent Bertino, NERSC, Norway |
| 13:00-13:30 | **The impact of assimilating SST, Argo and SLA data into a tidally driven model for the Brazil current region**<br>Rafael Santana[1], Filipe Costa[1], Davi Mignac[2], Alex Santana[3], Clemente Tanajura[1]<br>[1]Federal University of Bahia, Brazil; [2]University of Reading, UK; [3]University of the Balearic, Spain | |
| 13:30-14:00 | **Assessing the ecological state of the ocean by integration of models and observations using data assimilation in MIKE 21/3 FM biogeochemical models**<br>Johan Henrik Andersson, Jesper Sandvig Mariegaard<br>DHI Group, Denmark | |
| 14:00-19:00 | Time off / Activities on your own | |
| **19:00** | **Dinner at Fløyen Folkerestaurant (participants need to arrange their own transportation)** | |

*Invited talks in **blue** color, speakers' names underlined, and titles in **boldface**

# 2018 EnKF workshop program

## Wednesday 30/05/2018

| | | |
|---|---|---|
| 08:30-09:15 | **Uncertainty representation in reservoir history matching with ensemble methods: how complex does a model have to be?**<br>Yan Chen<br>Total GRC, UK | Session chair: Dean Oliver, Uni Research CIPR, Norway |
| 09:15-09:45 | **Integration of model diagnostic tools within ensemble history matching: methodology application and experiences**<br>Stefania Lo Forte, Patrizia Anastasi, Giorgio Fighera, Fulvia Turri, Ernesto Della Rossa<br>Eni S.p.A, Italy | |
| 09:45-10:15 | **Accounting for model errors in iterative ensemble smoothers**<br>Geir Evensen[1,2]<br>[1]IRIS, Norway; [2]NERSC, Norway | |
| **10:15-10:30** | **Break** | |
| 10:30-11:15 | **TBC**<br>Remus Hanea<br>Statoil AS, Norway | Session chair: Trond Mannseth, Uni Research CIPR, Norway |
| 11:15-11:45 | **Subdomain adjoint-based variational data assimilation for reservoir history matching**<br>Cong Xiao[1], Arnold Heemink[1], Olwijn Leeuwenburgh[1,2], Hai Xiang Lin[1]<br>[1]TUDelft, Netherlands; [2]TNO, Netherlands | |
| 11:45-12:15 | **Hybrid sparse dictionary construction using K-SVD and DCT for history matching by ES-MDA**<br>Sungil Kim[1], Baehyun Min[2]<br>[1]CERFACS, France; [2]Ewha Womans University, Republic of Korea | |
| **12:15-13:15** | **Lunch** | |
| 13:15-13:45 | **Using the Ensemble Transform Kalman Filter to estimate uncertainty in Full Waveform Inversion**<br>J. Thurin, R. Brossier, L. Metivier<br>Universite Grenoble-Alpes, France | Session chair: Geir Nævdal, IRIS, Norway |
| 13:45-14:15 | **Big data assimilation and uncertainty quantification in ensemble-based 4D seismic history matching**<br>X. Luo<br>IRIS, Norway | |
| **14:15-14:30** | **Break** | |
| 14:30-15:00 | **Joint utilization of geophysical data types, with application to monitoring of CO2 injection in the Skade formation**<br>S. Tveit[1], T. Mannseth[1], J. Park[2], G. Sauvin[2], R. Agersborg[3]<br>[1]Uni Research CIPR, Norway; [2]NGI, Norway; [3]Octio, Norway | Session chair: Remus Hanea, Statoil, Norway |
| 15:00-15:30 | **A novel multilevel method for assimilating spatially dense data**<br>Kristian Fossum, Trond Mannseth<br>Uni Research CIPR, Norway | |
| 15:30-16:00 | **History matching real production and seismic data for the Norne field combining seismic inversion, petroelastic models, and fluid flow simulations**<br>Rolf Lorentzen[1], Tuhin Bhakta[1], Dario Grana[2], Xiaodong Luo[1], Randi Valestrand[1], Geir Nævdal[1]<br>[1]IRIS, Norway; [2]University of Wyoming, USA | |
| **16:00-16:05** | **Concluding remarks (Dean Oliver, Uni Research CIPR, Norway)** | |

# 2018 EnKF workshop program

## Poster session: 17:00-18:00, Monday 28/05/2018

**A general data assimilation scheme and the comparison with the standard Kalman filter counterpart**

K. Belyaev[1,2], A. Kuleshov[3], I. Smirnov[2], C.A.S. Tanajura[4]

[1]Russian Academy of Science; [2]Moscow State University, Russia; [3]Keldysh Institute of Applied Math, Russia; [4]Federal University of Bahia, Brazil

**Data assimilation in coupled hydrological models: challenges and opportunities**

Natascha Brandhorst[1], Daniel Erdal[2], Insa Neuweiler[1]

[1]Leibniz Universität Hannover, Germany; [2]Eberhard Karls Universität Tübingen, Germany

**Impacts of assimilating ARGO into a hybrid coordinate ocean model 1/12°**

F. B. Costa, C. A. S. Tanajura

Federal University of Bahia, Brazil

**Long-time stability and accuracy of ensemble transform filter algorithms**

Jana de Wiljes[1], Theresa Lange[2], Sahani Pathiraja[1], Sebastian Reich[1], Wilhelm Stannat[2]

[1]University of Potsdam; [2]Technical University Berlin

**Assimilation of sea ice in an Earth system model and its impacts for climate prediction**

Madlen Kimmritz[1,2], Francois Counillon[1,2], Ingo Bethke[2,3], Noel Keenlyside[2,6], Cecilia Bitz[4], Francois Massonnet[5,7], Yiguo Wang[1,2]

[1]NERSC, Norway; [2]Bjerknes Centre for Climate Research, Norway; [3]Uni Research, Norway; [4]University of Washington, USA; [5]Universite Catholique de Louvain, Belgium; [6]University of Bergen, Norway; [7]Barcelona Supercomputing Center, Spain

**Towards automatic and adaptive localization for ensemble-based history matching**

Xiaodong Luo, Tuhin Bhakta

IRIS, Norway

**Estimation of model error covariances using the expectation-maximization algorithm combined with the ensemble Kalman filter**

Manuel Pulido[1,2], Pierre Tandeo[3], Marc Boquet[4], Alberto Carrassi[5], Magdalena Lucini[1,2]

[1]University of Reading, UK; [2]Universidad Nacional del Nordeste, Argentina; [3]IMT-Atlantique, France; [4]CEREA-ENPC, France; [5]NERSC, Norway

**Stochastic, iterative ensemble Kalman smoothers**

Patrick N. Raanes[1,2]

[1]NERSC, Norway; [2]IRIS, Norway

**Bayesian Inversion for High Dimensional systems using Data Assimilation**

Sangeetika Ruchi[1], Svetlana Dubinkina[1], Marco Iglesias[2]

[1]CWI, Netherlands; [2]University of Nottingham, UK

**Towards more robust optimization for iterative filters and smoothers**

Martin Verlaan[1,2], Xiaohui Wang[1]

[1]TUDelft, Netherlands; [2]DELTARES, Netherlands

*Presenters' names underlined