

Fifth EAGE Workshop on High Performance Computing for Upstream 2021

Online
6 - 8 September 2021

ISBN: 978-1-7138-3576-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2021) by the European Association of Geoscientists & Engineers (EAGE)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact by the European Association of Geoscientists & Engineers (EAGE)
at the address below.

European Association of Geoscientists & Engineers (EAGE)
PO Box 59
3990 DB Houten
The Netherlands

Phone: +31 88 995 5055
Fax: +31 30 634 3524

eage@eage.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

LEVERAGING GPUS FOR MATRIX-FREE OPTIMIZATION WITH PYLOPS	1
<i>M. Ravasi</i>	
UP-TO-DATE ASSESSMENT OF 3D FREQUENCY-DOMAIN FULL WAVEFORM INVERSION BASED ON THE SPARSE MULTIFRONTAL SOLVER MUMPS	6
<i>P.R. Amestoy, J.Y. L'Excellent, C. Puglisi, A. Buttari, T. Mary, M. Gerest, L. Combe, S. Operto</i>	
LARGE-SCALE FINITE-DIFFERENCE AND FINITE-ELEMENT FREQUENCY-DOMAIN SEISMIC WAVE MODELING WITH MULTI-LEVEL DOMAIN-DECOMPOSITION	11
<i>S. Operto</i>	
HYBRIDIZED DISCRETIZATIONS FOR SEISMIC WAVE SIMULATIONS.....	16
<i>L. Gao, D. Keyes</i>	
TOWARD HIGH PERFORMANCE ASYNCHRONOUS RTM WITH TEMPORAL BLOCKING AND BUFFERED I/O.....	21
<i>L. Qu, H. Ltaief, D. Keyes</i>	
HPC IN THE CLOUD MVP	26
<i>J. Pontvianne, D. Klahr, D. Cooper</i>	
HPC WORKLOAD MANAGEMENT FOR FULL RESOURCE UTILIZATION.....	31
<i>N. Bienati, L. Bortot, C. Fortini, J. Panizzardi</i>	
LEVERAGING DAOS FILE SYSTEM FOR SEISMIC DATA STORAGE.....	35
<i>M. Moawad, A. Nasr, O. Marzouk, K. El Amrawi, P. Thierry, J. Lombardi, M. Chaarawi</i>	
CLOUD ELASTICITY COMBINED WITH INNOVATIVE ASSISTED HISTORY MATCH ACCELERATES RESERVOIR RISK ASSESSMENT	40
<i>C. Cosson, T. Taha, P. Ward, S. Tadepalli, D. Tishechkin</i>	
GEOSX: A MULTIPHYSICS, MULTISCALE, RESERVOIR SIMULATOR FOR HPC	45
<i>H. Gross</i>	
GPU ACCELERATED FWI USING THE OPEN CONCURRENT COMPUTING ABSTRACTION (OCCA)	50
<i>A. St-Cyr, S. Reker, S. Frijters, S. Chawdhary, A. Panda, S. Banerjee, H. Knibbe, M. Muruganatham</i>	
OPENSOURCE RTM USING DPC++ PROGRAMMING MODEL.....	55
<i>A. Ayyad, A. Nasr, E. Nasr, I. Mounir, O. El-Maihy, M. Samier, M. El-Sherbiny, Z. Osama, K. Elamrawi, S. Gogar, P. Thierry</i>	
GPUFORT: A SOURCE-TO-SOURCE TRANSLATOR FOR FORTRAN ACCELERATOR DIALECTS.....	60
<i>M. Sabony</i>	
APPLICATION OF THE VECTORIZATION LIBRARY NSIMD TO THE EFISPEC3D KERNEL	65
<i>G. Quintin, S. Jubertie, F. De Martin, K. Peou</i>	

PERFORMANCE CHARACTERIZATION OF A VECTOR ARCHITECTURE FOR SEISMIC APPLICATIONS.....	70
<i>V. Etienne, A. Momin, L. Gatineau, S. Momose</i>	
PERFORMANCE EVALUATION OF STENCIL CALCULATION IN RTM CODE.....	75
<i>S. Momose, Y. Kubo, M. Ikuta</i>	
NONLINEAR PRECONDITIONING FOR TWO-PHASE FLOWS	80
<i>L. Luo, X. Cai, D. Keyes</i>	
IMPROVING GPU THROUGHPUT OF RESERVOIR SIMULATIONS USING NVIDIA MPS AND MIG	85
<i>R. Gandham, Y. Zhang, K. Esler, V. Natoli</i>	
TOWARD AN APPLICATION OF QUANTUM COMPUTING IN GEOPHYSICS	90
<i>M. Dukalski</i>	
MPI + DPCPP FOR SCALABLE AND PORTABLE RTM.....	95
<i>A. Ayyad, A. Nasr, E. Nasr, I. Monir, M. Samier, M. El-Sherbiny, Z. Osama, P. Thierry, S. Gogar, C. Andreolli</i>	
OPTIMIZING HPC PARAMETERS FOR REVERSE TIME MIGRATION	100
<i>R. Sampath</i>	

Author Index