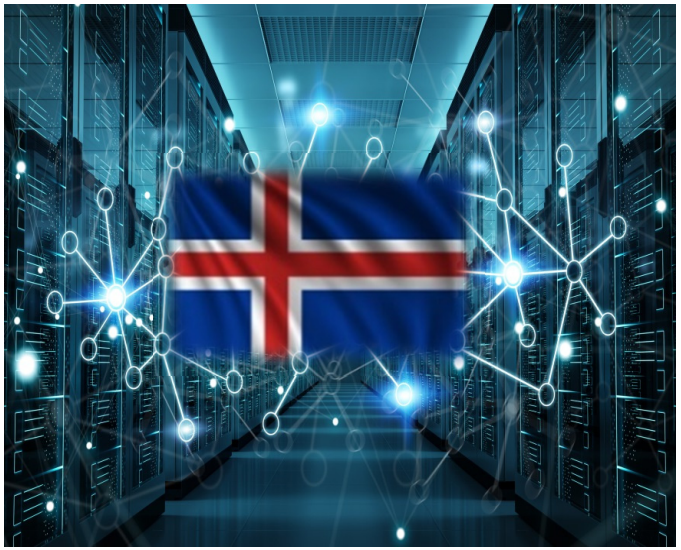


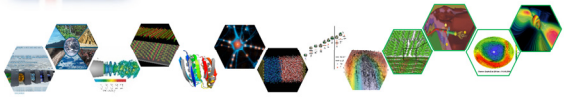
Icelandic HPC National Competence Center for HPC & AI & EuroHPC JU

PROF. DR. – ING. MORRIS RIEDEL, UNIVERSITY OF ICELAND & JUELICH SUPERCOMPUTING CENTRE (GERMANY)

24TH SEPTEMBER, RANNIS WORKSHOP, UNIVERSITY OF ICELAND, GROSKA, ROOM ADA

@ProfDrMorrisRiedel @Morris Riedel @MorrisRiedel @MorrisRiedel https://www.youtube.com/channel/UCWC4VKHmL4NZgFfKoHtANKg

IHPC National Competence Center for HPC & AI in Iceland



EuroHPC Joint Undertaking

EOSC NORDIC

RAISE Center of Excellence

ADMIRE

UNIVERSITY OF ICELAND
SCHOOL OF ENGINEERING AND NATURAL SCIENCES
FACULTY OF INDUSTRIAL ENGINEERING, MECHANICAL ENGINEERING AND COMPUTER SCIENCE

EURO

HELMHOLTZAI | ARTIFICIAL INTELLIGENCE COOPERATION UNIT

DEEP Projects

JÜLICH Forschungszentrum | JÜLICH SUPERCOMPUTING CENTRE

RANNIS Workshop & Agenda Items

- EuroHPC JU Administration
  - New Regulation & Governing Board Membership
  - Multi-annual workplan
  - Future Calls (Drafts, no Digital Europe work programme yet)
- EuroCC Phase II (maybe from ~September 2022)
  - Simulation and Data Lab Strategy & IHPC.IS
  - Possibility of co-funding according to 50/50 model of JU
- Future of Centre of Excellences (CoEs)
  - CHEESE (Vedurstofan), RAISE (HI)
- Invitation EuroCC Review
  - Public Event (see Invitation letter for funding authorities)
- Joint Procurements with Industry
  - Exploring possibilities to join with Industry (e.g., Kaiser Global) to host EuroHPC machine?

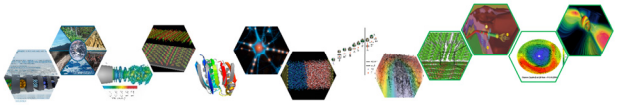
Executive Summary – Major Icelandic HPC Activities

Icelandic National Infrastructure for HPC

- ❖ **HPC hardware funds** by RANNIS; now via **roadmap IReiP**
- ❖ Proposals yearly required to obtain funds still
- ❖ Joint proposal from IHPC community

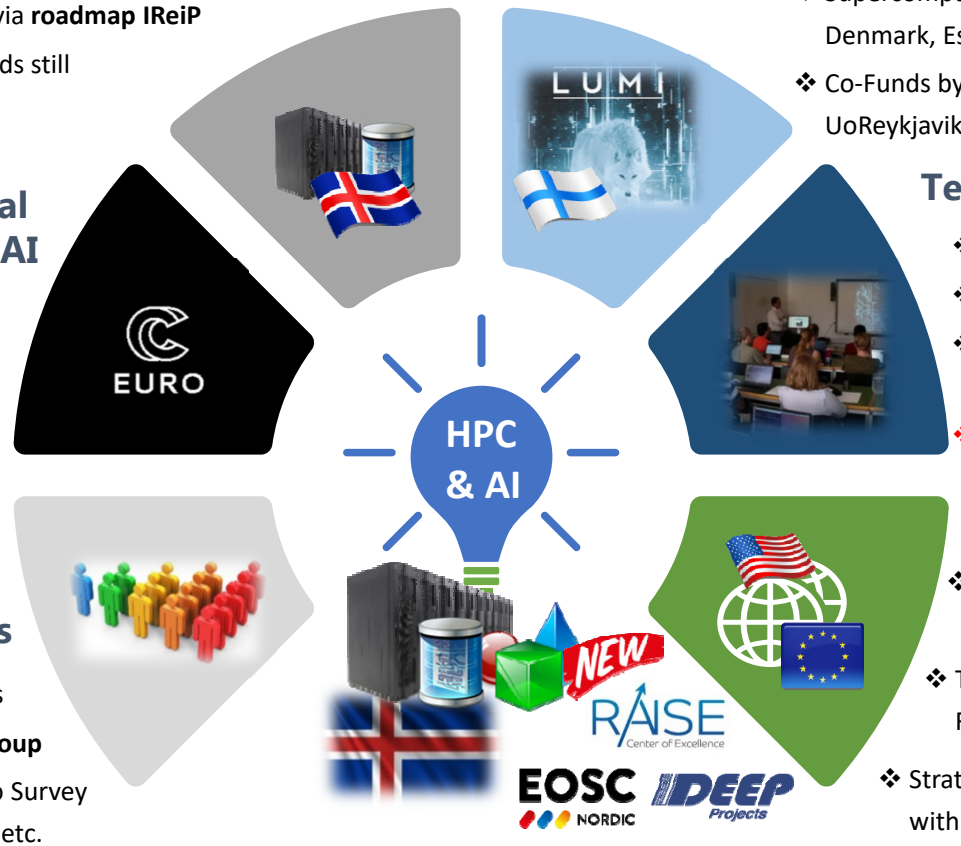
EuroHPC EuroCC National Competence Center for HPC & AI

- ❖ EU Project (09/2020-08/2022), 2 years
- ❖ Building **Simulation and Data Labs (SDLs)** of the IHPC Community of Users
- ❖ **Supports industry engagement in HPC**



IHPC Community of Users

- ❖ Organized around RANNIS proposals
- ❖ **~53 scientific experts & research group**
- ❖ UoIceland/UoReykjavik, Iceland Geo Survey ÍSOR, Met Office & **industry: Matis**, etc.



EuroHPC LUMI Supercomputer in Finland

- ❖ Supercomputer funded by Finland, Belgium, Czech Republic, Denmark, Estonia, Iceland, Norway, Poland, Sweden, Switzerland
- ❖ Co-Funds by EC and Iceland participation funds from: UoIceland, UoReykjavik, and Hannes Jonsson & Egill Skulason

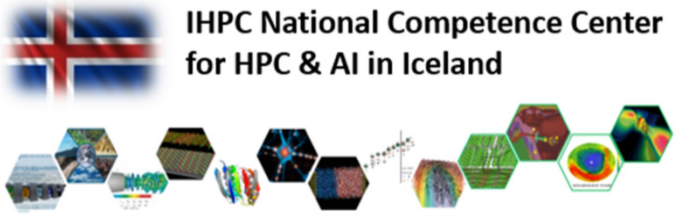
Teaching & Education in HPC & AI

- ❖ University of Reykjavik
- ❖ University of Iceland
- ❖ Arctic Webinar Series (with US partners)
- ❖ **H2020 MSc in HPC Pilot (EduHPC proposal)**

International Cooperations

- ❖ Tactical: ~4 Joint PhDs with **Juelich Supercomputing Centre** in Germany (#1 HPC System in Europe)
- ❖ Tactical**: EC Projects** like DEEP-EST, EOSC-Nordic, RAISE Center of Excellence (CoE), etc.
- ❖ Strategic: Plans of building an **Icelandic National Lab** with international cooperation together with Industry (e.g. Kaiser Global, other investors)

EuroCC Activities – Selected Benefits towards Bottom-Up Community Building

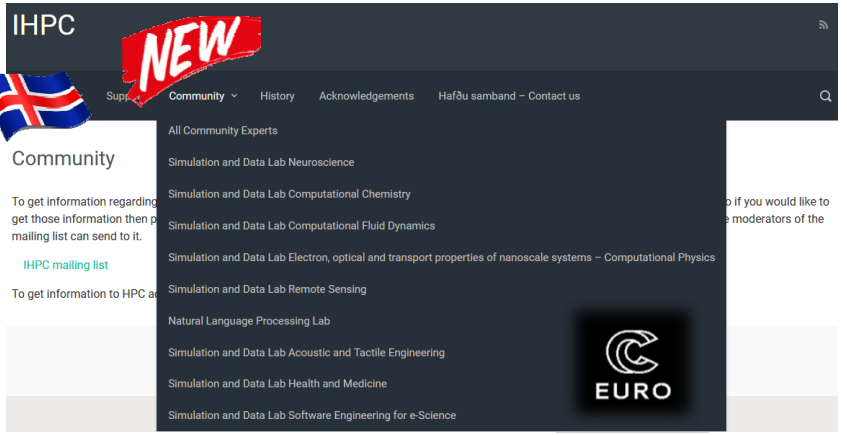


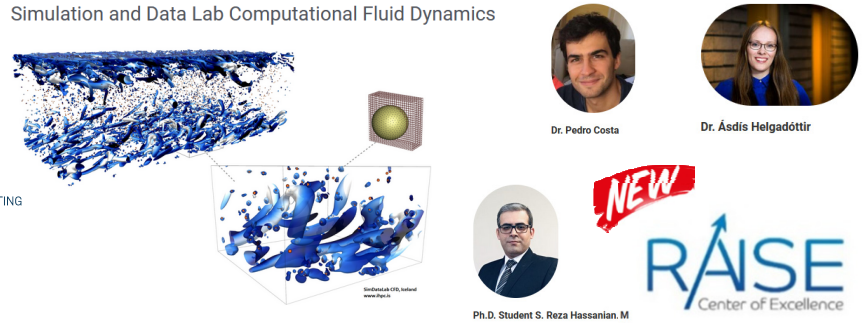
[1] Icelandic HPC Community Web page

- Simulation & Data Lab Communities
  - Experts w.r.t. **HPC in domain-specific topics**
- Based on extensive community experience
  - Juelich Supercomputing Centre in Germany works with the model for ~16 years

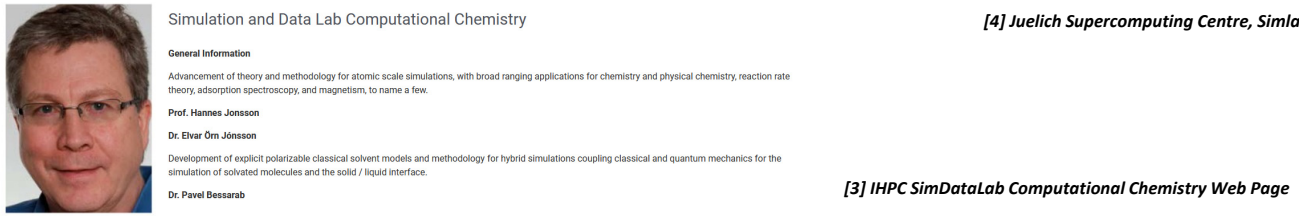
JÜLICH Forschungszentrum | JÜLICH SUPERCOMPUTING CENTRE

[4] Juelich Supercomputing Centre, Simlabs





[2] IHPC SimDataLab CFD Web Page



[3] IHPC SimDataLab Computational Chemistry Web Page

Perform International & Icelandic HPC Community Workshops

Workshop Objectives

F2F WORKSHOP

Bring together a diverse group of Icelandic and international stakeholders to discuss the role of HPC and related areas within Iceland without losing sight of its international links.

PERFORM COMMUNITY BUILDING

Perform community building in developing new successful joint activities between academia and industry, potentially creating new joint Simulation and Data Labs or collaborations.

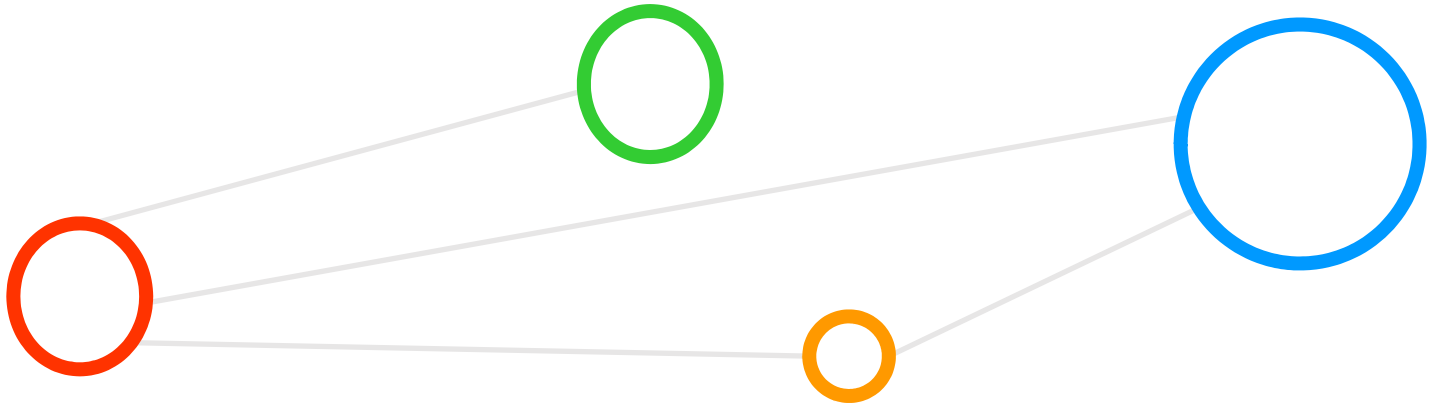
DOCUMENT COMPETENCIES

Document competencies, achievements, activities, and lessons learnt from participating stakeholders of Icelandic HPC efforts and associated international activities.

RECOMMENDATIONS

Identify best practices and core principles with a set of recommendations for developing the future Icelandic HPC ecosystem, including necessary skills, funding opportunities, applications, Centre of Excellences, community events, and sustainable infrastructure developments.

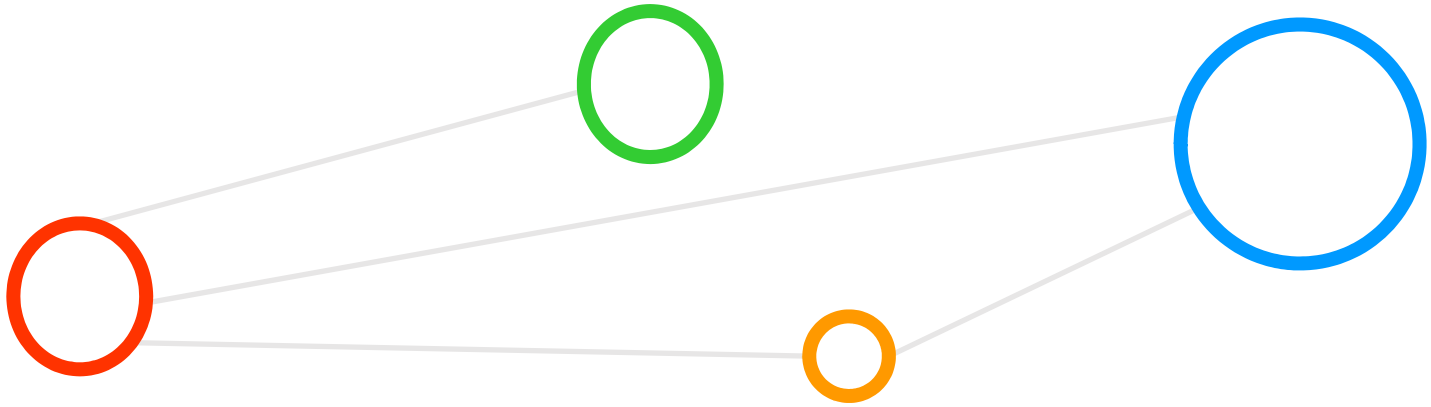
Selected References



Selected References

- [1] Icelandic HPC Community Web Page, Online: ihpc.is/community
- [2] Icelandic HPC Simulation and Data Lab Computational Fluid Dynamics (CFD), Online: https://ihpc.is/simulation-and-data-lab-computational-fluid-dynamics/
- [3] Icelandic HPC Simulation and Data Lab Computational Chemistry, Online: https://ihpc.is/simulation-and-data-lab-computational-chemistry/
- [4] Juelich Supercomputing Centre (JSC) Simulation and Data Labs, Online: https://www.fz-juelich.de/ias/jsc/EN/Expertise/SimLab/simlab_node.html

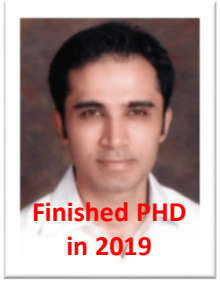
ACKNOWLEDGEMENTS



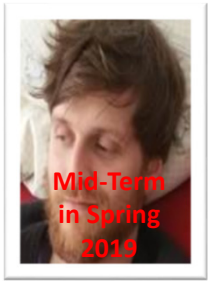
Acknowledgements – High Productivity Data Processing Research Group

PD Dr.
G. Cavallaro

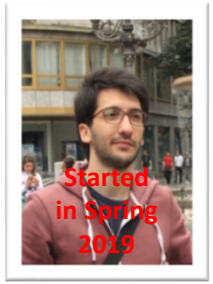
Senior PhD
Student
A.S. Memon



PD Dr.
M.S. Memon



PhD Student
E. Erlingsson

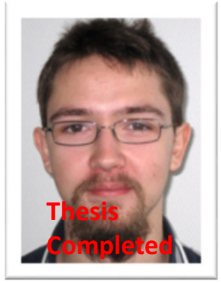


PhD Student
S. Bakarat

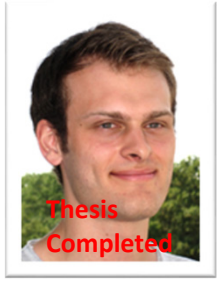
PhD Student
R. Sedona

PhD Student
P. H. Einarsson

Dr. M. Goetz
(now KIT)

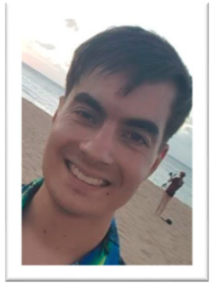


MSc M.
Richerzhagen
(now other division)

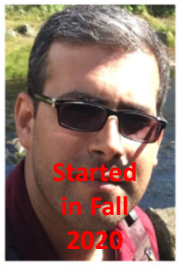


MSc
P. Glock
(now INM-1)

MSc
C. Bodenstein
(now
Soccerwatch.tv)



MSc G.S.
Guðmundsson
(Landsverkjun)



PhD Student
Reza

This research group has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 763558 (DEEP-EST EU Project) and grant agreement No 951740 (EuroCC EU Project) & 951733 (RAISE EU Project)

Data
Science
Big
Research
science
big
methods
analysis
processing
simulations
TB
technologies
computing
European
computational
Scientific
Computational
E.g
Centre
climate
Computing
nodes
centers
research
databases
HPC
Juelich
datasets
Supercomputing
performance
management
Climate
modelling
structures
access
System
storage
Environment
scientific
important
Infrastructure
Enable
Modelling
ENES
EUDAT
services
resources
year
new
funding
concepts
device
Analysis
Computer
expertise
disciplines
results
measurement
Policy-based
cross-disciplinary
Cross-Disciplinary
forms
like
EU
brain
increasing
images
often
Hardware
Technologies
distributed
data-intensive
Service
community
Project
DLCL
DLCLs
JSC
Understanding
Germany
NASA
Provide
Energy
Simulation
systems
day
Health
Earth
directory
project
General
Structure
hundreds
Services
network
Landscape
system
compute
acquisition
e.g
use
codes
stored
Resources
analyze
Level
references
engineering
international
SMAQ
model
formats
via
etc
DKRZ
Use
PB
Key
basis
physical
IPCC
Common
Methods
Using
Work
levels
external
Large
Summary
Matters
Concrete
current
cores
large-scale
Processing
AR5
create
MapReduce
High
Test
fusion
within
Approaches
construction
Fusion
files
different
Nutshell
GB