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[www.thuhpgc.org](http://www.thuhpgc.org)

July 25<sup>th</sup>, 2016

Dear Friends,

It's been a while since our last gathering for the research updates of the High Performance Geo-Computing (HPGC) Group at Tsinghua University.

It's our pleasure to send you this invitation to the second annual meeting of HPGC, which will be held at the beautiful city of Wuxi, sitting by the great lake of Taihu, on Sept. 8-10, 2016.

In this year's meeting, we would bring to you the following things:

- method innovation in the domain of exploration geophysics, such as our recent progress on the development of the Ensemble FWI method, which tries to apply the power of Ensemble Kalman filter in the field of inversion problems;
- acceleration for various geophysics applications, ranging from beam migration, ETE forward modeling, to the most recent Q-RTM;
- a close look at the world's fastest supercomputer, Sunway TaihuLight (now you know why we invite you to Wuxi this time), and our early experience on running different things on this huge system;
- a poster session that covers other topics, such as deep learning, differential evolution, and high-frequency trading (a little bit off the main track).

As in the previous meetings, we look forward to the participations of all our sponsors, as well as other oil & gas companies, service companies, and HPC companies.

Looking forward to seeing you in Wuxi, in September, 2016.

Yours sincerely,

Haohuan

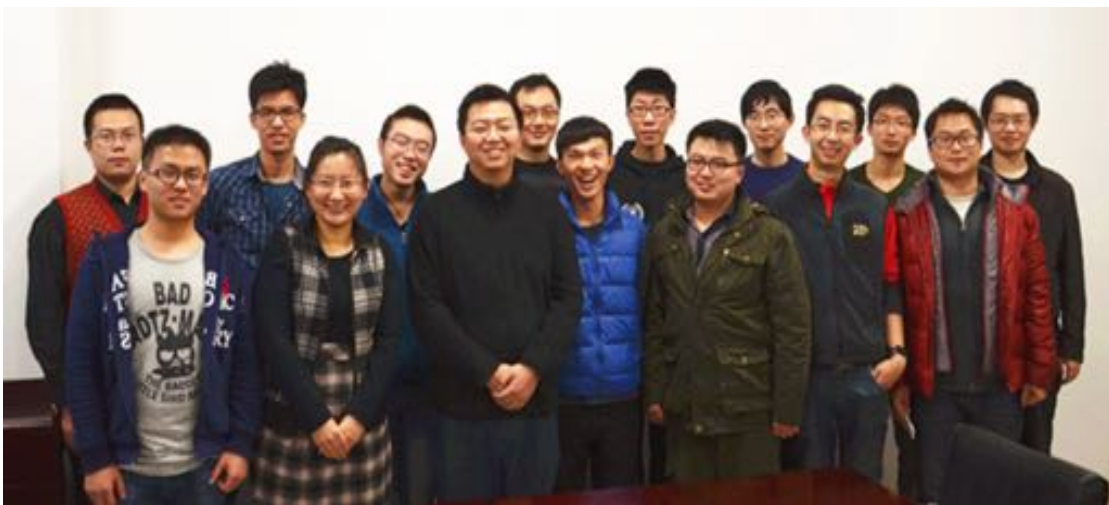
## About us: Tsinghua HPGC

The Tsinghua High Performance Geo-Computing (HPGC) research group was founded in the year of 2011. The group has been led by Dr. Haohuan Fu, who worked in Tsinghua University as an associate professor since Dec, 2010.

As a computer scientist who has been working in the geoscience domain for years, Dr. Fu build the group to promote the fusion of HPC technologies and geoscience applications, and to provide training and education for postgraduate students that would develop knowledge and expertise in computer science, computational mathematics, and geoscience.

The methodology that the HPGC tries to develop is to tackle research and engineering challenges from a combined perspective that consists of the geo-science application at the top, the numerical algorithm in the middle, and the hardware architecture at the bottom. Through a systematic approach that tries to arrive at the optimal option from all three different angles, we are striving to provide the best HPC solution for various geoscience applications. We are also in close cooperation with National Supercomputing Wuxi Center, which hosts the world's fastest supercomputer, and has the potential to bring breakthroughs in various methods and scientific domains.

The HPGC group currently includes 14 young and passionate researchers, of which 1 is a PostDoc Fellow, 9 are PhD candidates, and 4 are Master candidates. While the current research activities cover a wide spectrum of topics (geophysics exploration, climate modeling, data mining for geo-scientific data, deep learning algorithms and applications etc.), the focus has always been applying HPC technology to accelerate the computation, the data analysis, and even the new scientific discoveries in corresponding domains.



## Tentative Agenda

<b>September 8th, Thursday</b>	
<b>Time</b>	<b>Session</b>
<b>13:00 - 15:30</b>	Registration
<b>16:00 - 17:30</b>	A Short Tour to the National Supercomputing Center in Wuxi
<b>17:30 - 18:30</b>	Ice Breaker and Meeting Preview
<b>18:30 - 20:30</b>	Buffet Dinner
<b>9th September, Friday</b>	
<b>Time</b>	<b>Session</b>
<b>07:00 - 08:30</b>	Breakfast
<b>08:40 - 08:45</b>	Opening Speech, Prof. Guangwen Yang
<b>08:45 - 09:20</b>	“HPGC 2014-2016: An Overview”, Dr. Haohuan Fu
<b>09:20 - 10:00</b>	Keynote Speech, <b>TBD</b>
<b>09:50 - 10:50</b>	Student Session I  <ol style="list-style-type: none"> <li>1. A GPU-based Parallel Beam Migration Design (Conghui He)</li> <li>2. Reconfigurable Computing for Geoscience Application (Lin Gan)</li> <li>3. Cache-friendly Design for Complex Spatially-variable Coefficient Stencils on Many-core Architectures (Jiarui Fang)</li> </ol>
<b>10:50 - 11:10</b>	Coffee Break & Poster
<b>11:10 - 12:00</b>	Oil and Gas Industry Session, <b>TBD</b>
<b>12:00 - 13:30</b>	Lunch
<b>13:30 - 14:50</b>	Student Session II  <ol style="list-style-type: none"> <li>1. Approximating Q propagation to speed up 3D elastic RTM (Conghui He)</li> <li>2. Evaluating the POWER8 Architecture Through Optimizing Stencil-Based Algorithms (Jingheng Xu)</li> <li>3. Ensemble Source Encoding Full Waveform Inversion with Self-adaptive Regularization (Bingwei Chen)</li> </ol>
<b>14:50 - 15:20</b>	HPC Industry Session, <b>TBD</b>
<b>15:50 - 16:10</b>	Coffee Break & Poster

<b>16:10 - 17:10</b>	<b>Student Session III</b> 1. Deep learning in remote sensing image classification and object detection (Weijia Li) 2. Accelerating Q-Reverse Time Migration using cufft on GPU (He Zhang) 3. A Peta-Scale High-Resolution Experimental Model for Sunway TaihuLight (Junfeng Liao)
<b>17:10 - 18:10</b>	Discussion and Wrap Up
<b>18:30 - 20:30</b>	Dinner
<b>10th September, Saturday</b>	
<b>Time</b>	<b>Session</b>
<b>08:30 - 12:00</b>	Group Activities
<b>12:00 - 13:30</b>	Lunch

**Poster:**

1. An extremely low-latency hardware design for market server (Junfeng Liao)
2. swDNN: Evaluation and Optimization of Convolutional Neural Network on Sunway SuperComputer (Jiarui Fang)
3. TADE: Tight Adaptive Differential Evolution (Weijie Zheng)
4. F-CNN: FPGA based Framework for Training Convolutional Neural Network (Wenlai Zhao)

## Acknowledgements

We do appreciate the funding and equipment support from the following organizations, including both government agencies and companies. Without your support, it would be impossible for the young talents in our group to explore and verify their crazy research ideas. We do look forward to your participation in this coming annual meeting of HPGC.



国家自然科学基金委员会  
National Natural Science  
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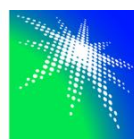


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