SUN Deyong （孙德永）

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Address: Beijing Institute of Technology, China
Interests: Computational Physics, Isogeometric Analysis, HPC, Structural Optimization, Machine Learning

RESEARCH STATEMENT

I am forever fascinated and motivated by advancing simulation science, and always pursue their industrial applications in petroleum engineering, aerospace engineering, civil and environmental engineering, mechanical engineering in order to improve energy efficiency and material safety and protect the environment. Meanwhile, I also maintain the interest in high-performance computing, particularly as it relates to designing scalable numerical algorithms for simulation.

EDUCATION

09/2018-06/2021 **Beijing Institute of Technology (BIT), China** ***MSc* in Computational Mechanics**

* Excellent Graduate Student (in Beijing and BIT)

* **GPA**: 3.53/4 (86/100) Range: 1/44

Core modules: Computational Solid Mechanics (96), Mechanics of Composite Materials (90), Design and Applications of Advanced Materials (91), Numerical Analysis (86), Process of Modern Mechanics (88), English Level A for Master Students (92)

09/2014-06/2018 **China University of Petroleum (CUP), China** ***BSc* in Petroleum Engineering (elite class)**

* Postgraduate Candidates Exempt from Admission Exam

* **GPA**: 4.10/5 (93/100) Range: 13/194

Core modules: Theoretical Mechanics (99), Material Mechanics (91), Fluid Mechanics (91), Advanced Mathematics (97), Linear algebra (90), College Physics (99), The C Programming Language (94), Mathematical Modelling (93), Probability and Statistics (95)

PUBLICATION

1. Sun Deyong*, Dai Rui, Dong Chunying, et al (2021), ***RI-IGABEM for 2D viscoelastic problems and its application to solid propellant grains*** [J]. Comput. Methods Appl. Mech. Engrg , 378 (2021) 113737.
2. Sun Deyong*, Dong Chunying (2020), ***Shape optimization of heterogeneous materials based on isogeometric boundary element method*** [J]. Comput. Methods Appl. Mech. Engrg, 370 (2020) 113279. (10 citations)
3. Sun Deyong*, Dong Chunying (2021), **I*sogeometric analysis of the new integral formula for elastic energy change of heterogeneous materials*** [J]. J. Comput. Appl. Math, 382 (2021) 113106.
4. Dai Rui, Dong Chunying, Xu Chuang, Sun Deyong* (2021), ***IGABEM of 2D and 3D liquid inclusions*** [J]. Eng. Anal. Bound. Elem, 132 (2021) 33-49.
5. Sun Deyong*, Dong Chunying (2021). ***RI-IGABEM for viscoelastic analysis*** [C]. Beijing Congress of Theoretical and Applied Mechanics, (2021).
6. Sun Deyong*, Dong Chunying (2019), ***Isogeometric Boundary Element Application based on new elastic energy Increment integral formula*** [C]. Chinese Congress of Theoretical and Applied Mechanics, (2019).
7. Su Guandong, Zhao Lanling, Zhang Peng, Sun Deyong*, Gu Xun, Han Beiyu. (2017). ***Numerical Simulation of Electric Field in Hydroelectric Simulation Experiment Based on Matlab PDETOOL*** [J]. Research and Exploration in Laboratory, 36(10):123-126,144. DOI:10.3969/j.issn.1006-7167.2017.10.029. (In Chinese)
8. Su Guandong, Gu Xun, Zhao Lanling, Sun Deyong*, Han Beiyu, Chen Linhui. (2017). ***Visual Teaching and Computer-based Experiment of Fluid Flow in Porous Media with PDETOOL of Matlab*** [J]. Research and Exploration in Laboratory, 36(8):137-142,160. DOI:10.3969/j.issn.1006-7167.2017.08.033. (In Chinese)

RESEARCH EXPERIENCE

06/2020-Present **Isogeometric Boundary Element Method for Viscoelastic Effects of Solid Propellant**

Research Assistant Supervisor: Prof. Chunying Dong

- Simulating the viscoelastic effects of solid propellant by isogeometric boundary element
- Employing Laplace transform and correspondence principle to obtain analytical solutions
- Extending this framework to simulate the fracture and debonding behaviors of viscoelastic-plastic materials in solid propellant

03/2019-06/2020 **Studies on Rapid and Direct Algorithm of Isogeometric Boundary Element for Large Scale Multilayer Complex Coating Structures**

National Natural Science Foundation of China ***Project No.11972085***

Research Assistant Supervisor: Prof. Chunying Dong

- Obtained 2D and 3D complexed CAD models from Rhino and reconstructed them by MATLAB and Fortran according to basic parameters
- Applied the shape optimization analysis based on the gradient-based optimization method (MMA) to elastic problems
- Applied the parallel computing method with Fortran and OPENMP to improve the computing efficiency
- Implemented Rapid and Direct Algorithm to optimize large scale coating structures

06/2018-03/2019 **Isogeometric Boundary Element Method for Turbine Blade Failure in Aeroengines**

National Natural Science Foundation of China ***Project No.11672038***

Research Assistant Supervisor: Prof. Chunying Dong

- Rebuilt 2D NACA airfoil geometries by NURBS using MATLAB
- Implemented Galerkin boundary element method to calculate the potential problem
- Used Lagrange multiplier to deal with Kutta condition in coefficient matrix
- Simulated the fluid-structure coupled behavior of turbine blades
- Compared numerical results with that from traditional panel method and Xfoil

09/2017-09/2018 **Development of Heavy Oil in the Post-steam Era**

National Student Research and Innovation Program

Project Leader (Funding: ￥20,000) Supervisor: Prof. Xiaohu Dong

- Carried out visual physical simulation experiment of steam injection in heavy oil reservoirs and analysed the spatial distribution of remaining oil
- Adopted reservoir numerical simulation method to study the distribution of remaining oil in different types of heavy oil reservoirs

09/2016-09/2017 **Tight Oil Development Technology and Economic Feasibility Evaluation**

Beijing Student Research and Innovation Program

Team Leader (Funding: ￥10,000) Supervisor: Prof. Shenglai Yang

- Predicted the total production and its decline law of tight oil
- Investigated and built economic evaluation models
- Evaluated the production limits under economic feasibility development

TECHNICAL SKILLS

Software	○ 3D Modelling: Rhino. ○ Programming Software: MATLAB, Fortran, Visual Studio, Python, C++. ○ Post-processing: Tecplot. ○ FE Modelling Software: Abaqus. ○ Parallel Computing Software: ParaCloud ○ Operating System: Linux and Ubuntu, Windows ○ Others: Photoshop, Solidworks, CAD
Language	○ Chinese, English (**IELTS - 7.0**)

AWARDS

06/2021	Beijing Excellent Graduate Awards, Beijing Municipal Education Commission
05/2021	BIT Excellent Graduate Awards (Rank 1st); BIT Outstanding Master Thesis Award
12/2020	BIT Outstanding Graduate Model
12/2017	CUP Advanced Individual in Science and Technology
06/2017	WUYI Mathematical Modelling League (3rd Prize), JSIAM
11/2015	National Mathematical Competition (3rd Prize); CUP Physical Competition (1st Prize)
09/2015	CUP Mathematical Competition (2rd Prize)

SCHOLARSHIPS

2020	National Scholarship for Graduates; BIT Academy Scholarship of Best Graduate
2018	Outstanding Freshman Scholarship (Grade 1)
2017	CUP 1st Scholarship
2016	CUP 1st Scholarship
2015	ENNGroup Scholarship

INTERNSHIPS

04/2017-09/2017	**China National Petroleum Corporation**
02/2018-05/2018	○ Occupational Qualification Certificate for Oil Extractor ○ Investigated the whole process of oil production
07/2018-10/2018	**Beijing AIIA Technology Co. Ltd** ○ Schemed and propagated the 2018 Smart China Expo ○ Organized and planned the autonomous driving competition, and took part in 2018i-VISTAGrand Challenge ○ Kept abreast of trends and advancements in driverless industry according to the general development of website (WeChat, Weibo, Zhihu, forum, etc);