

ANNEX B

UNIVERSITY OF MILAN

Public selection for recruiting No.1 tenure track researcher(s) (RTT) for competition sector 04/A4-GEOPHYSICS, (scientific-disciplinary sector GEO/11-APPLIED GEOPHYSICS) at the Department of Earth Sciences Ardito Desio, (announcement published in Official Gazette No.DR 707/2024 of 24/01/2024) - Competition code 5484

[Jian Chen] CURRICULUM VITAE

PERSONAL DATA

Surname	Chen
Name	Jian
Date of Birth	06 April, 1996
Current work	Type B Postdoctoral Fellow
College	The Department of Earth Sciences "A. Desio", University of Milan

QUALIFICATIONS

EDUCATION AND TRAINING

Degree and training	Major	University	Research work
Bachelor	Measurement and Control Technology and Instrument	Jilin University (China) (09.2014--06.2018)	Thesis Title: Three-dimensional inversion for surface nuclear magnetic resonance (SNMR) detection. (Study the forward modeling and inversion technology of SNMR in 1-D, 2-D and 3-D) (Award: Excellent undergraduate graduates of Jilin University)
PhD	Measuring and Testing Technologies and Instruments	Jilin University (China) (09.2018 -05.2023, a directly PhD program)	Thesis Title: Shallow surface imaging method using towed transient electromagnetic technology. (Study the forward modeling and inversion strategies of tTEM data, including the laterally constrained inversion, spatially constrained inversion, deep learning inversion and Bayesian inversion) (Award: Excellent PhD graduates of Jilin University)

Postdoctoral Fellow (Type B)	The Department of Earth Sciences "A. Desio"	University of Milan (02. 2023- 05.2025)	<p>Development of 3D EM forward response, Jacobian computation and 3D inversion in Fortran language, parallelized in OpenMP;</p> <p>Implementation of filters, transmitter waveform and primary field;</p> <p>Automatic finite element mesh generation, also with topography;</p> <p>tTEM/AEM data Bayesian inversion using probabilistic neural network</p>
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TEACHING ACTIVITIES AT ITALIAN OR FOREIGN UNIVERSITIES

Year	Teaching experience
2023	<p>Role: Thesis Co-Supervisor</p> <p>Thesis title: Indagini Elettromagnetiche Waterborne sul Lago di Iseo per la caratterizzazione delle interazioni tra acque superficiali ed acque sotterranee</p> <p>Student name: Andrea Miglierina</p> <p>Level: Bachelor degree, University of Milan</p> <p>Supervision details: Teach the student how to process the tTEM and FloaTEM data, and analyze the inversion results</p>
2022-2024	<p>Role: Thesis Co-Supervisor</p> <p>Thesis title: Joint inversion of shallow surface transient electromagnetic and ground penetrating radar</p> <p>Student name: Wenjing Xia</p> <p>Level: Master degree, Jilin University</p> <p>Supervision details: Teach students how to implement TEM inversion and how to add prior information to the inversion</p>
2022-2024	<p>Role: Thesis Co-Supervisor</p> <p>Thesis title: Denoising and inversion of transient electromagnetic data based on deep learning framework</p> <p>Student name: Yihan Shen</p> <p>Level: Master degree, Jilin University</p> <p>Supervision details: Teach the student how to implement the deep learning algorithm in EM data processing and inversion. The thesis results have been published by the journal of <i>IEEE TGRS</i>, and I co-authored the paper.</p>

2022-2023	<p>Role: Thesis Co-Supervisor</p> <p>Thesis title: Design of transient electromagnetic low-noise receiving sensor and weak coupling structure</p> <p>Student name: Shenjie Wang</p> <p>Level: Master degree, Jilin University</p> <p>Supervision details: Teach the student how to design TEM weak coupling coil structure and EM 1D forward modeling. The thesis results have been published by the journal of <i>Micromachines</i>, and I co-authored the paper.</p>
2020-2023	<p>Role: PhD lecturer</p> <p>Teaching load: 6 hours/year; three academic years (20-21; 21-22; 22-23)</p> <p>Topic: Geophysical electromagnetics (within the course of <i>Geoscience instruments</i>)</p> <p>Level: First-year and second-year undergraduate students, Jilin University</p> <p>Number of student participants: 80</p> <p>Teaching details: Introduce the basic principles and applications of electromagnetic methods in geophysics to junior undergraduate students</p>

ATTESTED TRAINING OR RESEARCH ACTIVITIES AT QUALIFIED ITALIAN OR FOREIGN INSTITUTIONS

Year	Research activity, research institution and research project (as project number in the “IMPLEMENTATION OF PROJECTS” section)	Specific content
2023- to date	<p>3D forward modelling and inversion for EM data</p> <p>University of Milan</p> <p>Project 1</p>	<p>I was engaged in research within the HORIZON EUROPE GLOBAL CHALLENGE-RIA/IA/CSA SEMACRET project (SEMACRET, i.e. Sustainable exploration for orthomagmatic (critical) raw materials in the EU: Charting the road to the green energy transition). In SEMACRET airborne electromagnetic is used to detect raw material mineral resources in Europe.</p> <p>My main responsibility is the 3D modeling and inversion of electromagnetic data (including Airborne TEM, tTEM and FloaTEM data). At present, the debugging of the 3D forward modeling code has been completed.</p>
	Probability inversion for tTEM data using deep learning	Study the application of deep learning algorithm to fast interpretation of TEM data. When the training set is representative, deep learning shows good imaging performance and efficiency.

2023- to date	University of Milan Project 1	We designed a composite probabilistic neural network (cPNN) structure that can simultaneously provide deterministic imaging and Bayesian probabilistic imaging results, providing a comprehensive interpretation of the observed data and estimating its uncertainty. We verified this neural network with nearly 200 km tTEM survey data collected on the Iseo Lake in Italy.
2022	Trans-dimensional Bayesian inversion and adaptive constrained quasi-3D inversion method of TEM Jilin University Project 2 and Project 3	The conventional TEM inversion method can give only a single optimal solution that satisfies the fitting error. It cannot evaluate the reliability of the inversion results. To obtain more comprehensive inversion results, I studied the trans-dimensional Bayesian (Trans-Bayes) inversion method. The Trans-Bayes inversion method gives the credible interval of the resistivity model and quantifies the uncertainty in the inversion results.
2020- 2021	Design of weak coupling compensation structure of small-loop TEM transceiver coil Jilin University Project 2	<p>The distance between the transmitting coil and the receiving coil of small-loop TEM is very close, and the mutual inductance coupling interference is strong, which seriously pollutes the effective signal. My work is to design weak coupling coil structure to suppress this interference. I proposed a new TEM structure with non-coplanar bucking compensation. Compared with the traditional design, the new structure can suppress the primary field coupling significantly, and has a better fault tolerance for the installation accuracy.</p> <p>For comparison, I have also worked on a review of the main performance parameters of international representative HTEM systems, and analyzes the performance and structural characteristics of VTEM, SkyTEM and HeliTEM systems.</p>
2019	3D forward modeling and inversion of surface nuclear magnetic resonance (SNMR) Jilin University Project 4	Based on the project "Research on surface NMR 3-D groundwater inversion technology", I studied the forward modeling and inversion technology of SNMR technology in 1-D, 2-D and 3-D, and proposed to use the complex domain 3D SNMR inversion method to improve the imaging resolution of deep aquifer.

IMPLEMENTATION OF PROJECTS

Year	Project
2023-2025	<p>“Sustainable exploration for orthomagmatic (critical) raw materials in the EU: Charting the road to the green energy transition (SEMACRET)” HORIZON EUROPE GLOBAL CHALLENGE-RIA/IA/CSA.</p> <p>Budget: 6.67 million, Euros</p> <p>Role: Participant, 3D finite element forward modelling and inversion for TEM data; probabilistic inversion.</p>
2019-2023	<p>“Research on towed transient electromagnetic detection instrument and imaging technology for road geological exploration” the national major scientific research instrument development project, China</p> <p>Budget: 0.78 million, Euros</p> <p>Role: Participant, TEM data inversion interpretation</p>
2020-2021	<p>“Transient electromagnetic probability inversion based on trans-dimensional Bayesian algorithm” Jilin University, China</p> <p>Budget: 1,300 Euros</p> <p>Role: PI</p>
2018-2019	<p>“Research on surface NMR 3-D groundwater inversion technology” Jilin University, China</p> <p>Budget: 13,000 Euros</p> <p>Role: Participant, Debugging the 3D SNMR inversion code</p>

ORGANISATION, SUPERVISION AND COORDINATION OF NATIONAL AND INTERNATIONAL RESEARCH GROUPS, OR PARTICIPATION IN THEM

Year	University	RESEARCH GROUPS	Role
2023-to date	University of Milan	The EEM Team for Hydro & eXploration	<p>Team member</p> <p>(EM data and induced polarization data acquisition; EM 3D forward modeling and inversion code development; Probabilistic neural network for EM data uncertainty inversion)</p>
2020-2022	Jilin University	Urban Underground Space EM Detection Team	<p>Team member</p> <p>(TEM forward modeling and inversion, deep learning denoising and real-time imaging)</p>
2018-2020	Jilin University	MRS Groundwater Detection Group	<p>Team member</p> <p>(3D forward modeling and inversion of surface NMR data)</p>

SPEAKING AT NATIONAL AND INTERNATIONAL CONFERENCES AND CONVENTIONS

Date	Title	Place
14 Feb.2024	Bayesian imaging method for towed transient electromagnetic data using probabilistic neural networks (The 42nd National Conference of the GNGTS)	Ferrara,Italy
7 Feb.2024	Bayesian imaging method for towed transient electromagnetic data using probabilistic neural networks (AGLC young researchers' workshop)	Online Presentation Milan,Italy
9 Jan.2024	3D EM and DCIP EEMverter code development (Sustainable exploration for orthomagmatic (critical) raw materials in the EU: Charting the road to the green energy transition (SEMACRET) 4th consortium meeting)	Seville, Spain
29 Aug. 2020	Applicability of transient electromagnetic fast forward modeling algorithm with small loop (2020 SEG Workshop on Underground Water and Karst Imaging)	Online Presentation Beijing, China
30 Jul. 2019	Design of weak coupling compensation structure of small-loop TEM (2019 SEG Geophysics for Smart City Development Workshop)	Geosciences International Conference Center, Beijing, China (Best Oral Presentation Award)
25 Oct. 2019	SNMR three-dimensional inversion interpretation for imaging of groundwater (Workshop on surface electromagnetic technology for detecting groundwater in the near-surface and in mines)	Australian Resources Research Centre in Perth (Commonwealth Scientific and Industrial Research Organisation, CSIRO)
19 Sep. 2018	Surface magnetic resonance tomography for three-dimensional groundwater using a complex model. (Poster) (7th International Workshop on Magnetic Resonance 2018)	Jilin, China

In the period 2020-2023 in China it was not possible to travel and participate to conferences in presence due to COVID-19 pandemic.

NATIONAL AND INTERNATIONAL AWARDS AND ACCOLADES FOR RESEARCH ACTIVITY

Year	Description of award
2022	<p>Misac Nabighian scholarship</p> <p>National/International: <i>International</i></p> <p>Selection procedure: <i>Select one graduate student (global) in geophysics (electromagnetics) annually. By academic performance</i></p> <p>Ranking: <i>The only one</i></p> <p>Number of applicants: <i>Unknown</i></p> <p>Prize amount: <i>4,400 Euros</i></p> <p>Selection organization: <i>Society of Exploration Geophysicists</i></p>
2022	<p>SEG/Gerald W. Hohmann Memorial Scholarship</p> <p>National/International: <i>International</i></p> <p>Selection procedure: <i>Select two graduate students in geophysics (electromagnetics) annually. By academic performance</i></p> <p>Ranking: <i>Select two globally, no ranking</i></p> <p>Number of applicants: <i>Unknown</i></p> <p>Prize amount: <i>200 Euros</i></p> <p>Selection organization: <i>Society of Exploration Geophysicists</i></p>
2023	<p>First Prize of People's Daily Online (China) Scholarship</p> <p>National/International: <i>National</i></p> <p>Selection procedure: <i>Select Five individuals from Chinese university students annually. By academic performance and volunteer activities</i></p> <p>Ranking: <i>Ranking first</i></p> <p>Number of applicants: <i>760</i></p> <p>Prize amount: <i>2,560 Euros</i></p> <p>Selection organization: <i>People's Daily Online (China)</i></p>
2022	<p>First Prize of Chinese Instrumentation and Measurement Society Scholarship</p> <p>National/International: <i>National</i></p> <p>Selection procedure: <i>Select Ten individuals from Chinese university postgraduate students annually. By academic performance.</i></p> <p>Ranking: <i>No ranking</i></p> <p>Number of applicants: <i>Unknown</i></p> <p>Prize amount: <i>380 Euros</i></p> <p>Selection organization: <i>Chinese Instrumentation and Measurement Society</i></p>
2022	<p>Shenghua Ye (China) Scholarship</p> <p>National/International: <i>National</i></p>

	<p>Selection procedure: <i>Select Ten individuals from Chinese university postgraduate students annually. By academic performance.</i></p> <p>Ranking: <i>Ranking second</i></p> <p>Number of applicants: <i>Unknown</i></p> <p>Prize amount: <i>1,280 Euros</i></p> <p>Selection organization: <i>Teaching Guidance Committee of the Ministry of Education</i></p>
2022	<p>National (China) scholarship for PhD students in 2022</p> <p>National/International: <i>National</i></p> <p>Selection procedure: <i>Each department in Jilin university selected four PhD students annually. By essay and merit.</i></p> <p>Ranking: <i>Ranking first</i></p> <p>Number of applicants: <i>85</i></p> <p>Prize amount: <i>3,840 Euros</i></p> <p>Selection organization: <i>The Ministry of Education (China)</i></p>
2021	<p>National (China) scholarship for PhD students in 2021</p> <p>National/International: <i>National</i></p> <p>Selection procedure: <i>Each department in Jilin university selected four PhD students annually. By essay and merit.</i></p> <p>Ranking: <i>Ranking first</i></p> <p>Number of applicants: <i>85</i></p> <p>Prize amount: <i>3,840 Euros</i></p> <p>Selection organization: <i>The Ministry of Education (China)</i></p>
2023	<p>First-class Academic Achievement Scholarship for Graduate Students at Jilin University</p> <p>National/International: <i>University-level</i></p> <p>Selection procedure: <i>Each department in Jilin university selected two PhD students annually. By essay.</i></p> <p>Ranking: <i>Ranking first</i></p> <p>Number of applicants: <i>120</i></p> <p>Prize amount: <i>2,560 Euros</i></p> <p>Selection organization: <i>Jilin university (China)</i></p>
2022	<p>First-class Academic Achievement Scholarship for Graduate Students at Jilin University</p> <p>National/International: <i>University-level</i></p> <p>Selection procedure: <i>Each department in Jilin university selected two PhD students annually. By essay.</i></p> <p>Ranking: <i>Ranking first</i></p> <p>Number of applicants: <i>120</i></p>

	Prize amount: <i>2,560 Euros</i> Selection organization: <i>Jilin university (China)</i>
2023	Excellent PhD Graduate of Jilin University National/International: <i>University-level</i> Selection procedure: <i>Each department in Jilin university selected two PhD students annually. By academic performance and merit.</i> Ranking: <i>No ranking</i> Number of applicants: <i>40</i> Prize amount: <i>No Prize</i> Selection organization: <i>Jilin university (China)</i>
2022	Outstanding College Students of Jilin Province (China) National/International: <i>National</i> Selection procedure: <i>Each department in Jilin university selected one postgraduate student annually. By academic performance and merit.</i> Ranking: <i>No ranking</i> Number of applicants: <i>85</i> Prize amount: <i>No Prize</i> Selection organization: <i>Department of Education of Jilin Province (China)</i>
2022	First-class Excellent Scholarship for Graduate Students at Jilin University National/International: <i>University-level</i> Selection procedure: <i>Each department in Jilin university selected two PhD students annually. By essay.</i> Ranking: <i>Ranking first</i> Number of applicants: <i>30</i> Prize amount: <i>190 Euros</i> Selection organization: <i>Jilin university (China)</i>
2019	SEG Best Oral Presentation Award National/International: <i>International</i> Selection procedure: <i>By oral report performance in 2019 SEG Geophysics for Smart City Development Workshop, Beijing, China.</i> Ranking: <i>No ranking</i> Number of applicants: <i>Unknown</i> Prize amount: <i>No Prize</i> Selection organization: <i>Society of Exploration Geophysicists</i>

SCIENTIFIC PUBLICATIONS: JOURNALS

1. Shengbao Yu, Yihan Shen, Fanze Meng, Jian Chen , Yang Zhang. "An Efficient Transient Electromagnetic Uncertainty 1D Inversion Method Based on Mixture Density Network". <i>IEEE Transactions on Geoscience and Remote Sensing</i> . 23 January 2024, United States, DOI: 10.1109/TGRS.2024.3357650.
2. Jian Chen , Yang Zhang, Jun Lin. "High-resolution quasi-three-dimensional transient electromagnetic imaging method for urban underground space detection." <i>IEEE Transactions on Industrial Informatics</i> . March 2023, 19 (3), 3039-3046, United States, DOI: 10.1109/TII.2022.3176890.
3. Shengjie Wang, Yuqi Zhao, Yishu Sun, Weicheng Wang, Jian Chen , Yang Zhang. "Design of a Differential Low-Noise Amplifier Using the JFET IF3602 to Improve TEM Receiver." <i>Micromachines</i> . December 2022, 13, 2211, Switzerland, DOI: 10.3390/mi13122211.
4. Tingting Lin, Yue Li, Yusheng Lin, Jian Chen , Ling Wan. "Magnetic resonance sounding signal extraction using the shaping-regularized Prony method." <i>Geophysical Journal International</i> . August 2022, 231, 2127-2143, England, DOI: 10.1093/gji/ggac317.
5. Jian Chen , Yang Zhang, Tingting Lin. "Transient Electromagnetic Machine Learning Inversion Based on Pseudo Wave Field Data." <i>IEEE Transactions on Geoscience and Remote Sensing</i> . June 2022, 60, 5917410, United States, DOI: 10.1109/TGRS.2022.3187021.
6. Jun Lin, Jian Chen , Yang Zhang. "Rapid and high-resolution detection of urban underground space using transient electromagnetic method." <i>IEEE Transactions on Industrial Informatics</i> . April 2022, 18, 2622-2631, United States, DOI: 10.1109/TII.2021.3104012.
7. Jian Chen , Shuai Pi, Yang Zhang, Tingting Lin. "Weak coupling technology with noncoplanar bucking coil in a small-loop transient electromagnetic system." <i>IEEE Transactions on Industrial Electronics</i> . March 2022. 69, 3151-3160, United States, DOI: 10.1109/TIE.2021.3066940.
8. Jian Chen , Jia W, Zhang Y, Lin J. "Integrated TEM and GPR data interpretation for high-resolution measurement of urban underground space." <i>IEEE Transactions on Instrumentation and Measurement</i> . March 2022, 71, 5004409, United States, DOI: 10.1109/TIM.2021.3134995.
9. Jian Chen , Yang Zhang, Jun Lin. "Fast transdimensional Bayesian transient electromagnetic imaging for urban underground space detection." <i>Measurement</i> . January 2022, 187, 110300, England, DOI: 10.1016/j.measurement.2021.110300.
10. Jun Lin, Jian Chen , Fei Liu, Yang Zhang. "The helicopter time domain electromagnetic technology advances in China." <i>Surveys in Geophysics</i> . March 2021. 42, 585-624, Netherlands, DOI: 10.1007/s10712-021-09635-7.
11. Jian Chen , Yan F, Sun Y, Zhang Y. "Applicability of Transient Electromagnetic Fast Forward Modeling Algorithm with Small Loop." <i>Progress in Electromagnetics Research M</i> . November 2020, 98(1), 159-169, United States, DOI: 10.2528/PIERM20071602.

12. **Jian Chen**, Yang Y, Wan L, Lin T. "Surface Magnetic Resonance Tomography for Three-Dimensional Groundwater Using a Complex Model." *Progress in Electromagnetics Research C*. September 2020, 105, 101-115, United States, DOI: 10.2528/PIERC20061901.

SCIENTIFIC PUBLICATIONS: ABSTRACTS

1. **Jian Chen**, Gianluca Fiandaca. "Bayesian imaging method for towed transient electromagnetic data using probabilistic neural networks." GNGTS 2024, page: 1-6, 13-16 February 2024, Ferrara, Italy.
2. Gianluca Fiandaca, Bo Zhang, **Jian Chen**, Alessandro Signora, Francesco Dauti, Stefano Galli, Nicole Anna Lidia Sullivan, Arcangela Bollino, & Andrea Viezzoli. "EEMverter, a new 1D/2D/3D inversion tool for Electric and Electromagnetic data with focus on Induced Polarization." GNGTS 2024, page: 1-8, 13-16 February 2024, Ferrara, Italy.
3. Stefano Galli, Alessandro S, **Jian Chen**, Schaars, F, Grohen, M, Gianluca Fiandaca. "Waterborne electromagnetics: two case studies." GNGTS 2024, page: 1-6, 13-16 February 2024, Ferrara, Italy.
4. Gianluca Fiandaca, Alessandro Signora, Stefano Galli, **Jian Chen**, Compostella Chiara, Andrea Viezzoli. "Mapping surface/ground water interactions and embankment composition along the Po river with transient electromagnetics." GNGTS 2024, page: 1-3, 13-16 February 2024, Ferrara, Italy.
5. Gianluca Fiandaca, Bo Zhang, **Jian Chen**, Alessandro Signora, Francesco Dauti, Stefano Galli, Nicole Anna Lidia Sullivan, Arcangela Bollino, & Andrea Viezzoli. "Closing the gap between galvanic and inductive methods: EEMverter, a new 1D/2D/3D inversion tool for Electric and Electromagnetic data with focus on Induced Polarization." Australian Society of Exploration Geophysicists Extended Abstracts, Volume 2023 (2), page: 1-6, 8th International Airborne Electromagnetics Workshop, Fitzroy Island, September 2023. DOI: 10.5281/zenodo.10052691.
6. Yishu Sun, Sihe Huang, **Jian Chen**, Yang Zhang. "Research on Power Harmonic Noise Suppression Method Based on Genetic Algorithm for Urban TEM Data". The 9th International Conference on Environmental and Engineering Geophysics, page: 1-6, 11-14 October 2020, Changchun, China. DOI: 10.1088/1755-1315/660/1/012005
7. Yang Zhang, **Jian Chen**, Suhang Li. "A fast and effective method on lock-in amplifier to detect the weak SNMR signal". International Workshop on Gravity, Electrical & Magnetic Methods and Their Applications, page:116-119, Xi'an, China, May 19-22, 2019. DOI: 10.1190/GEM2019-030.1
8. Tingting Lin, Yujing Yang, **Jian Chen**, Ling Wan, Jun Lin. "Pre-polarization using in adiabatic pulses for detection of surface nuclear magnetic resonance". Symposium on the Application of Geophysics to Engineering and Environmental Problems 2018. Page:315-319, United States, DOI: 10.4133/sageep.31-023.

SCIENTIFIC PUBLICATIONS: PhD THESIS

Jian Chen. “Shallow surface imaging method using towed transient electromagnetic technology.”
June 2023, page: 1-154, Doctoral thesis, Jilin University, Changchun, China. Supervisor: Professor Jun Lin.

OTHER INFORMATION

Programming language: Fortran, Python, Matlab

Passion for code development, probabilistic deep learning, food and music

Reviewer in *IEEE Transactions on Geoscience and Remote Sensing*, *PLOS ONE*

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Google Scholar: <https://scholar.google.com/citations?user=TQyf4c8AAAAJ&hl=en>

h-index: 6; total citation:81; number of ESI high cited articles: 1; total impact factor : 70.8

Date

27/02/2024

Place

Milan, Italy