

CURRICULUM VITAE



MAINAK SAHA

Current Organization : National Institute for Materials Science (Japan)
Current Designation : Postdoctoral researcher (Microstructure Analysis Group,
Materials Evaluation Field, Research Centre for Structural
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Current Location : Tsukuba, Ibaraki-305-0047, Japan

WORK EXPERIENCE

Postdoctoral researcher

- Microstructure Analysis Group, Materials Evaluation Field, Research Centre for Structural
Materials, National Institute for Materials Science (NIMS, Japan)

-Joining date: 18/10/2023

RESEARCH SUMMARY

I am currently a postdoctoral researcher at Research Centre for Structural Materials, NIMS. I work in the Microstructure Analysis Group, Materials Evaluation Field under the supervision of Dr. T.T. Sasaki. My research interests include understanding hydrogen embrittlement mechanisms in steels and Al-alloys through in-depth determination of H-taps using Electron microscopy and 3D-Atom Probe analysis.

EDUCATION

Master of Science (M.S.) + Ph.D

- Joined: 09th July 2018
- Completed: 30th June 2023
 - Ph.D research supervisor: Dr-Ing K.G. Pradeep
 - Topic of Ph.D thesis: On the microstructural evolution and the mechanical response of Ni-alloyed FeMnAlC steel - A Correlative Microscopy study
 - C.G.P.A. during coursework: 9.25/10

Bachelor of Technology

- Institute: National Institute of Technology (NIT), Durgapur
- Department: Metallurgical and Materials Engineering
- Graduation year: 2018
- C.G.P.A.: 9.08/10
- Topic of B.Tech thesis: Kinetics of cyclic oxidation in ZrB₂-20 vol.% MoSi₂ ultra-high temperature ceramic matrix composites.

Trainings/Skills

- Scanning Electron Microscopy and Transmission Electron Microscopy
- Three-dimensional atom probe tomography (including Cryogenic atom probe tomography)

CAREER HIGHLIGHTS

National Institute for Materials Science (Japan)	Since Oct'23
Ph.D scholar (Prime Minister Research Fellowship, IIT Madras)	Jul'20-Jul'23
Ph.D scholar (Half-time Research Assistantship)	Jul'18-Jul'20
National Institute of Technology (NIT), Durgapur	Jun'14-Jun'18
Ministry of steel research fellow (undergraduate)	Aug'16 to Jun'18

PROJECTS

- Overall phase stability-mechanical property correlation in Ni-alloyed FeMnAlC low- density steels for automotive applications (Ph.D project).
- Kinetics of cyclic oxidation in ZrB₂-MoSi₂ ultra-high temperature ceramic matrix composites (B.Tech project).
- Intermetallic phase evolution in CoCrCuMnNi multicomponent alloy (B.Tech internship under supervision of Dr. B.S. Murty, Dept. of MME, IIT Madras)
- Understanding Hydrogen Embrittlement mechanism in Al-Zn-Mg alloys and steel using Electron Microscopy and Three-dimensional Atom Probe Tomography to design Hydrogen-resistant alloys. (NIMS postdoctoral project under the supervision of Dr. T.T. Sasaki)

PUBLICATIONS

Journals:

- Wei-Che Hsu, Takuma Saito, **Mainak Saha**, Hideyuki Murakami, Taisuke Sasaki and An-Chou Yeh. "On the Solidification and Phase Stability of Re-Bearing High-Entropy Superalloys with Hierarchical Microstructures." *Metals* 15, no. 8: 820. <https://doi.org/10.3390/met15080820>
- Vidilli, André L., Leonardo F. Gomes, Adriel P. Oliveira, **Mainak Saha**, Taisuke Sasaki, Lucas B. Otani, Ilya Okulov, and Claudemiro Bolfarini. "Segregation-induced microstructural refinement in a FeMnAlC-TiB metal matrix composite by laser powder bed fusion." *Progress in Additive Manufacturing* (2025): 1-8. <https://doi.org/10.1007/s40964-025-01104-6>
- Bhattacharyya, J. J., Faberman, S., Sullivan, A., **Saha, M.**, Sasaki, T., & Agnew, S. R. (2025). Strain partitioning-induced anisotropy in thermomechanically processed magnesium alloys comprised of earth-abundant elements. *Scripta Materialia*, 262, 116659. <https://doi.org/10.1016/j.scriptamat.2025.116659>

- Gault, B., Saksena, A., Sauvage, X., Bagot, P., Aota, L. S., Arlt, J et al. (2025). Towards establishing best practice in the analysis of hydrogen and deuterium by atom probe tomography. *Microscopy and Microanalysis*, 30(6), 1205-1220.
- Wang, Y., Tang, J., Fujihara, H., Adachi, N., Todaka, Y., Xu, Y., **Saha, M.**, Sasaki, T., Shimizu, K., Hirayama, K., Takeuchi, A., Uesugi, M. & Toda, H. (2024). Advancing the hydrogen tolerance of ultrastrong aluminum alloys via nanoprecipitate modification. *Corrosion Science*, 240, 112471. <https://doi.org/10.1016/j.corsci.2024.112471>
- M. Sadhasivam, S. Pavan Kumar, **Mainak Saha**, Chinmoy Mahata, K.G. Pradeep, Combinatorial Alloy Design: Renaissance in the Accelerated Development of High-Entropy Alloy, INAE Letters, 2024, doi:<https://doi.org/10.1007/s41403-024-00462-x>.
- **M. Saha**, M.B. Ponnuchamy, M. Sadhasivam, C. Mahata, G. Vijayaragavan, K. Gururaj, K. Suresh, N. Chandrasekaran, D. Prabhu, K. Kumbhar, K. Kumbhar, K.G. Pradeep, Revealing the Localization of NiAl-Type Nano-Scale B2 Precipitates Within the BCC Phase of Ni Alloyed Low-Density FeMnAlC Steel, JOM. 74 (2022) 3181–3190. <https://doi.org/10.1007/s11837-022-05349-2>.
- K. Gururaj, **M. Saha**, S.K. Maurya, R. Nama, A. Alankar, M.B. Ponnuchamy, K.G. Pradeep, On the correlative microscopy analyses of nano-twinned domains in 2 mol% zirconia alloyed yttrium tantalate thermal barrier material, Scr Mater. 212 (2022). <https://doi.org/10.1016/j.scriptamat.2022.114584>.
- G. Vijayaragavan, D. Prabhu, M.B. Ponnuchamy, K.R.S. Preethi Meher, R. Gautam, **M. Saha**, R. Gopalan, K.G. Pradeep, Microstructure evolution and phase analysis of Sm60Ni40 alloy, J Magn Magn Mater. (2022) 170323. <https://doi.org/10.1016/J.JMMM.2022.170323>.
- **M. Saha**, M. Mallik, Additive manufacturing of ceramics and cermets: present status and future perspectives, Sadhana - Academy Proceedings in Engineering Sciences. 46 (2021). <https://doi.org/10.1007/s12046-021-01685-2>.

Conference (Oral) presentation:

- **Saha, M.**, Li, Z., Ueji, R., Shibata, A. and Sasaki, T., 2025, July. On the identification of strong Hydrogen-trapping sites in a deformed pearlitic steel using 3D atom probe. In *International Conference on Electron Microscopy and XLIII Annual Meeting of the Electron Microscope Society of India, 2025, IISc Bangalore, India*.
- **Saha, M.**, Li, Z., Ueji, R., Shibata, A. and Sasaki, T., 2025, July. On the identification of strong Hydrogen-trapping sites in a deformed pearlitic steel using 3D atom probe. In *Atom Probe Tomography & Microscopy (APT&M 2025), Chennai, India*.
- **Saha, M.**, Ueji, R., Shibata, A. and Sasaki, T., 2025, June. On the Hydrogen trapping tendencies of different microstructural features in a caliber-rolled pearlitic steel using 3D atom probe. In *International conference on the strength of materials (ICSMA20), Kyoto, Japan*.
- LI, Zehao, **SAHA, Mainak**, UEJI, Rintaro, KIMURA, Yuuji, SHIBATA, Akinobu, OHKUBO, Tadakatsu, HONO, Kazuhiro, SASAKI, Taisuke. Identification of hydrogen trapping site in pearlitic steel by atom probe tomography. 15th International Symposium on Atomic Level Characterizations for New Materials and Devices '24. 2024, Kunibiki Messe, Matsue, Shimane, Japan.
- Po-Heng Chou, Haoran Xie, Thaviti Naidu Palleda, **SAHA, Mainak**, SASAKI, Taisuke, Kakehi, Kohi, TODA, Yoshiaki, MURAKAMI, Hideyuki, An-Chou-Yeh. Microstructures and properties of precipitation strengthened high-entropy alloys processed by SLM. 32nd International Materials Research Congress. 2024, Cancun, Mexico
- **Saha, Mainak**, Rintaro Ueji, Akinobu Shibata, and Taisuke Sasaki. "On the Hydrogen trapping tendencies of different microstructural features in a deformed pearlitic steel using Cryogenic Atom Probe Tomography." In *The Japan Institute of Metals and Materials Autumn Meet*. 2024, Osaka University, Japan.
- **Mainak Saha**, M.B. Ponnuchamy, M. Sadhasivam, N. Chandrasekaran, M. Srinivasan, K.G. Pradeep, Temporal evolution of nano-scale B2 precipitates and their localization in Ni-alloyed FeMnAlC low-density steel, Virtual APT&M 2022, Nanjing, China.
- **Mainak Saha**, A brief **discussion** on the tensile creep deformation behaviour of wrought single-phase γ -TiAl, International Conference on Materials, Manufacturing and Mechanical Engineering for Sustainable Developments-2020 (ICMSD 2020), Chennai, India.

- **Mainak Saha**, γ -TiAl alloy: revisiting tensile creep deformation behaviour and creep life at 832 °C, The International Conference on Materials Processing and Characterization (ICMPC), 2021, Hyderabad, India.
- **M. Saha**, S. Pramanik, R. Banik, P. Maurya, S. Singh, S.V. Raj, D.P. Madhur, T.R. Paul, R. Mitra, M.K. Mondal, M. Mallik, An Insight Into Cyclic Oxidation behavior of ZrB₂-20 Vol.% MoSi₂ Based Ultrahigh Temperature Ceramic Matrix Composite, International Conference on Industrial and Manufacturing Systems (CIMS), 2020, NIT Jalandhar, India
- **Mainak Saha**, M. Sadhasivam, M.B. Ponnuchamy, M. Srinivasan, N. Chandrasekaran, K. Kumbhar, K.G. Pradeep, On the three-dimensional atomic scale characterization of nano-scale B₂ phase in Ni-alloyed Fe-Mn-Al-C low-density steel, MetSA National Symposium, AMALGAM, Department of Metallurgical and Materials Engineering, IIT Madras, 2023.
- **Mainak Saha**, K. Guruvidyathri, A. Karati, B.S. Murty, Sequence of precipitation of sigma phase in CoCrCuMnNi High Entropy Alloy, NMD-ATM 2017, India.
- Wei-Che Hsu, Jhuo-Lun Lee, Tso-Wei Chen, **Mainak Saha**, Takuma Saito, et al.. Formation of Disordered Nano-particles and their influence on the Elevated Temperature Deformation of High Entropy Superalloys. <http://www.nanokorea-sympo.or.kr/technical.php>, 2024.
- Akhilesh Kumar Patel, Nawa Kenji, Yujun Wang, **Mainak Saha**, Taisuke Sasaki et al. Theoretical prediction and experimental evaluation of spin Hall conductivity of Ir₂MnAl Heusler alloy, SMS 2024, IIT Bombay, 2024

Conference (poster) presentation:

- **Mainak Saha**, Taisuke Sasaki, Towards exploring the possibility of strengthening an additively manufactured SUS316L steel through tuning of the local chemistry at cell boundaries, Creation of materials by superthermal fields, Osaka University, March 2025
(best poster award)

- **Mainak Saha**, M.B. Ponnuchamy, M. Sadhasivam, K.G. Pradeep, On the three-dimensional atomic scale characterization of nano-scale B2 phase in Ni-alloyed Fe-Mn-Al-C low-density steel, NIMS Award Symposium, October 2023, Tsukuba, Ibaraki, Japan.
- **Mainak Saha**, M.B. Ponnuchamy, M. Sadhasivam, K.G. Pradeep, Three-dimensional atomic scale characterization of nano-scale B2 phase in Ni-alloyed Fe-Mn-Al-C low-density steel, NMD-ATM 2022, Hyderabad, India.
- **Mainak Saha**, M. Sadhasivam, M.B. Ponnuchamy, M. Srinivasan, N. Chandrasekaran, K.G. Pradeep, On the three-dimensional atomic scale characterization towards understanding the evolution of nano-scale B2 phase in Ni-alloyed Fe-Mn-Al-C low-density steel, Annual Meeting of the Electron Microscopy Society of India (EMSI) 2023, University of Delhi, India.
- **M. Saha**, S. Pramanik, R. Banik, P. Maurya, S. Singh, S.V. Raj, D.P. Madhur, T.R. Paul, R. Mitra, M.K. Mondal, M. Mallik, An Insight Into Cyclic Oxidation behavior of ZrB₂-20 Vol.% MoSi₂ Based Ultrahigh Temperature Ceramic Matrix Composite, NMD-ATM 2018, India.

Book chapter(s):

- **M. Saha**, Additive manufacturing of compositionally complex alloys: trends, challenges, and future perspectives. 3D Printing Technologies: Digital Manufacturing, Artificial Intelligence, Industry 4.0. DeGruyter, 2024, <https://doi.org/10.1515/9783111215112-003>.
- **M. Saha**, M. Mallik, Metal-based conductive nano-inks: synthesis and characterization techniques, Smart Multifunctional Nano-Inks. (2023) 27–52. <https://doi.org/10.1016/B978-0-323-91145-0.00003-7>.
- M. Mallik, **M. Saha**, Carbon-Based Nanocomposites: Processing, Electronic Properties and Applications, in: Springer, Singapore, 2021: pp. 97–122. https://doi.org/10.1007/978-981-16-1052-3_5.
- **M. Saha**, M. Mallik, Additive Manufacturing and Characterisation of Biomedical Materials, Advanced Materials for Biomechanical Applications. (2022) 29–57.

<https://doi.org/10.1201/9781003286806-3>.

- **M. Saha**, M. Mallik, Surface engineering of nanomaterials : Processing and applications, Surface Engineering. (2022) 95–119. <https://doi.org/10.1201/9781003319375-4>.
- **M. Saha**, S. Pramanik, R. Banik, P. Maurya, S. Singh, S.V. Raj, D.P. Madhur, T.R. Paul, R. Mitra, M.K. Mondal, M. Mallik, An Insight Into Cyclic Oxidation behavior of ZrB₂-20 Vol.% MoSi₂ Based Ultrahigh Temperature Ceramic Matrix Composite, Modern Manufacturing Systems. (2022) 149–163. <https://doi.org/10.1201/9781003284024-13>.
- **M. Saha** and M. Mallik, “3D printing of nanoceramics for biomedical applications,” *Advanced Ceramic Coatings for Biomedical Applications*, pp. 111–135, Jan. 2023, doi: 10.1016/B978-0-323-99626-6.00002-0.

Conference publications:

- **Mainak Saha** (2022) α -TiAl alloy: revisiting tensile creep deformation behaviour and creep life at 832 °C, Advances in Materials and Processing Technologies, 8:sup3, 1317- 1327, DOI: [10.1080/2374068X.2021.1949175](https://doi.org/10.1080/2374068X.2021.1949175)
- **M. Saha**, S. Singh, S. Acharjee, C. Kandagatla, S. Chakrabartty, Analysis of structural differences of Ag Nanoparticles generated using Thermal and E-beam process based on SEM image, Proceedings of the 2nd International Conference on Inventive Computation Technologies (ICICT 2017) IEEE Xplore Compliant - Part Number:CFP17K52-ART, ISBN:978- 1-5090-6697-1
- Manab Mallik, **Mainak Saha**, Sayantani Santra, Sushree Ananya Tanaya, Sonam Kumari and Divyadutta Behura. Densification and characterization of pressureless sintered ZrB₂-20 vol% MoSi₂ ultra high temperature ceramic composites, Transactions of the Powder Metallurgy Association of India, 47, Jun-Dec 2021
- **M. Saha**, A brief discussion on the tensile creep deformation behaviour of wrought single-phase γ -TiAl, Mater Today Proc. (2021). <https://doi.org/10.1016/j.matpr.2020.11.189>.

Other(s):

- Gault, Baptiste, Aparna Saksena, Xavier Sauvage, Paul Bagot, Leonardo S. Aota, Jonas Arlt, Lisa T. Belkacemi et al. "Towards establishing best practice in the analysis of hydrogen and deuterium by atom probe tomography." arXiv preprint arXiv:2405.13158 (2024).

Honors and Awards:

- Best Oral presentation in the Annual meeting of the Electron Microscopy Society of India, IISc Bangalore, India 2025 (2025)
- Best poster award in Creation of Materials in Superthermal fields, Osaka University (2025)
- G.S. Tendolkar award for the best oral presentation in the Annual meeting of the Powder Metallurgy Association of India, Mumbai, India (2022)
- Prime Minister Research Fellowship (PMRF), Ministry of Education, Govt. of India (2020)
- Undergraduate Steel Research Fellowship, Ministry of Steel, Govt. of India (2016)

REVIEWING EXPERIENCE(S)

Overview of Journal manuscripts reviewed:

- For manuscripts reviewed from date range June 2020 - July 2025 (**number of manuscripts is mentioned within brackets**) (details available at **Web of Science profile: X-1018-2018**)
- International Journal of Plasticity (82)
- Additive Manufacturing (19)
- Materials and Design (1)
- Materials Research Express (4)
- International Journal of Hydrogen Energy (3)
- Journal of Applied Physics (2)
- Metallurgical and Materials Transactions A (2)
- Frontiers in Materials (1)
- Materials Science and Engineering A (25)

- Journal of Materials Science: Materials in Engineering (2)
- Critical Reviews in Solid State and Materials Sciences (1)
- Transactions of the Indian Institute of Metals (1)
- Progress in Additive Manufacturing (1)
- ACS Omega (2)

SOCIAL LINK(S)

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PERSONAL VITAE

Date of Birth	:	28 th August, 1995
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Linguistic Ability	:	English (Expert level), Hindi (Expert level), Bengali (mother tongue) and German (Basic A1 level)
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REFERENCES

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Referree 2

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Referree 3

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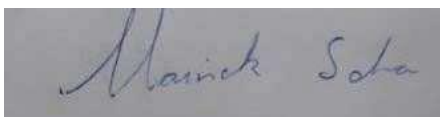
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Certified that the above information is true to my knowledge and verified

Signature:



Date: 21.07.2025

Place: Tsukuba, Ibaraki, Japan