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Professor and Director

Laboratory for Surface Modification and Interfacial Control on Strength Reliability of Materials and Structures

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EDUCATION

A.S. (Materials Science and Engineering), **Miyagi National College of Technology**, Natori, Japan (1987).

B.S. (Mechanical Engineering), **Chiba University**, Chiba, Japan (1989).

M.S. (Mechanical Engineering), **Chiba University**, Chiba, Japan (1991).

Ph.D (Machine Intelligence and Systems Engineering), **Tohoku University**, Sendai, Japan (1999).

Thesis topic: In-situ Measurement and Mechanistic Understanding of Degradation of Thermal Barrier Coating by Means of Impedance Spectroscopy Technique

Supervisor: Prof. Tetsuo Shoji

WORK EXPERIENCE

1991-1996 **NKK Corporation** (Present: JFE steel corp.), Kawasaki, Japan.
Researcher, Development of high tensile strength steels for automobiles.

1999-present **Tohoku University**, Sendai, Japan.
Research Associate (1999-2001)
Assistant Professor (2001-2002)
Associate Professor (2002-2012)
Professor (2013-present)
Visiting Researcher (2008.8-2008.10) Northwestern University, USA
Director of Fracture and Reliability Research Institute, Tohoku University (2019-present)

CURRENT RESEARCH

- Elucidation of degradation mechanisms of crept Ni base superalloys and aged thermal barrier coatings (TBCs)
- Development of new non-destructive evaluation technique for Ni base superalloys, TBCs and ceramic materials
- Development of bond strength enhancement techniques for TBCs
- Safety and reliability analyses for high speed train
- Development of coating and repairing technique by cold spray
- Elucidation of deposition mechanism of cold sprayed Metal, Ceramic, and polymer coatings
- Development of room temperature bonding technique

AWARDS

- 2010 **Best Paper Award**, Japan Thermal Spraying Society.
“Fundamental Study of Deposition Mechanism of Cold Sprayed Ni-base Superalloy Particle by Means of Molecular Dynamics Method”.
- 2011 **Best Paper Award**, Japan Thermal Spraying Society.
“Evaluation of reliability for cold sprayed polycrystalline Ni-base superalloy coatings”.
- 2011 **Best Paper Award**, International Thermal Spray Conference 2011.
"Deposition of oxide ceramics in atmosphere and at room temperature by powder jet deposition technique".
- 2013 **Seoul International Invention Fair Gold Prize**
- 2015 **Best Paper Award**, Japan Thermal Spraying Society.
“Improved Deposition Efficiency of Cold-Sprayed CoNiCrAlY with Pure Ni Coatings and its High-Temperature Oxidation Behavior after Pre-treatment in Low Oxygen Partial Pressure”.
- 2016 **Best Paper Award**, Japan Thermal Spraying Society.
“Effects of Spark-Plasma Sintering Treatment on Cold-Sprayed Copper Coatings”
- 2017 **Best Paper Award**, Japan Thermal Spraying Society.
“Experimental and Numerical Analyses on the Deposition Behavior of Spherical Aluminum Particles in the Cold-Spray-Emulated High-Velocity Impact Process”
- 2018 **Contribution Award**, The Society of Materials Science, Japan.
- 2019 **Best Paper Award**, Japan Thermal Spraying Society.
“Influence of Substrate Surface Roughness on Copper Coating Formation Behavior on Graphite by Low Temperature Plasma Spraying”

Total 23 awards

PROFESSIONAL MEMBERSHIP

- The Japan Society of Mechanical Engineers
- The Society of Materials Science, Japan
- Japan Thermal Spraying Society (Vice President)
- The Japanese Society for Non-Destructive Inspection
- Japan Society for Maintenology
- ASM international

- The American Ceramic Society
- Society of Automotive Engineering of Japan

PUBLICATIONS (in the last 5 years)

- 1) Jing Xie, Daniel Nelias, Helene Walter-Le, Kazuhiro Ogawa, Yuji Ichikawa, Simulation of the Cold Spray Particle Deposition Process, *Journal of Tribology*, Vol. 137, 2015, 041101-1~15. doi: 10.1115/1.4030257
- 2) 山崎泰広, 関翔馬, 佐藤達也, 大野直行, 曾根 通介, 市川裕士, 宮崎孝道, 小川和洋, コールドスプレーを用いた生体用多孔質チタンコーティングの開発, 溶射, 第52巻第2号 (2015) p.62-67 <http://doi.org/10.11330/jtss.52.62>
- 3) Kesavan Ravi, Yuji Ichikawa, Tiana Deplancke, Kazuhiro Ogawa, Olivier Lame, and Jean-Yves Cavaille, Development of Ultra-High Molecular Weight Polyethylene (UHMWPE) Coating by Cold Spray Technique, *Journal of Thermal Spray Technology*, Vol.24, No.6, pp.1015-1025, 2015. DOI: 10.1007/s11666-015-0276-5
- 4) 伊藤 潔洋, 市川 裕士, 小川 和洋, コールドスプレー模擬単粒子衝突試験装置の開発と粒子付着挙動の評価, 溶射, Vol. 52No. 4 p. 141-146, 2015. DOI: <http://doi.org/10.11330/jtss.52.141>
- 5) Yuji Ichikawa and Kazuhiro Ogawa, Effect of Substrate Surface Oxide Film Thickness on Deposition Behavior and Deposition Efficiency in the Cold Spray Process, *Journal of Thermal Spray Technology*, Vol. 24, Issue 7, pp 1269-1276, 2015. DOI: 10.1007/s11666-015-0299-y
- 6) Kesavan Ravi, Yuji Ichikawa, Kazuhiro Ogawa, Tiana Deplancke, Olivier Lame, and Jean-Yves Cavaille, Mechanistic Study and Characterization of Cold-Sprayed Ultra-High Molecular Weight Polyethylene-Nano-ceramic Composite Coating, *Journal of Thermal Spray Technology* Vol. 25, No.1, pp.160-169, 2016. DOI: 10.1007/s11666-015-0332-1
- 7) Kang-Il Lee, Kazuto Sato and Kazuhiro Ogawa, Mechanical Properties and Deposition Mechanism of Cold-Sprayed CoNiCrAlY/YSZ Cermet, *Materials Transactions*, Vol.57, No.3, pp.385-391, 2016. [doi:10.2320/matertrans.T-M2016802]
- 8) Kiyohiro Ito, Yuji Ichikawa, Kazuhiro Ogawa, Experimental and Numerical Analyses on the Deposition Behavior of Spherical Aluminum Particles in the Cold-Spray-Emulated High-Velocity Impact Process, Vol.57, pp.525-532, 2016. [doi:10.2320/matertrans.T-M2016803]
- 9) Paul Profizi, Alain Combescure, Kazuhiro Ogawa, SPH modeling of adhesion in fast dynamics: Application to the Cold Spray process, *Comptes Rendus Mécanique – Computational simulation of manufacturing processes*, Vol.344, pp.211–224, 2016. doi:10.1016/j.crme.2016.02.001
- 10) Paul Profizi, Alain Combescure, Kazuhiro Ogawa, Numerical analysis of single particle impact in the context of Cold Spray: a new adhesion model, *Earth and Environmental Science* 32, pp.1-4, (2016) 012062, doi:10.1088/1755-1315/32/1/012062
- 11) Kazuhiro Ogawa, Shun Hatta, Hiroyuki Yamazaki, Improvement of Interfacial Strength for Thermal Barrier Coatings by Formation of Wedge-Like Thermally Grown Oxide, *Additive Manufacturing and Strategic Technologies in Advanced Ceramics: Ceramic Transactions*, Volume 258, pp. 149-157, 2016, DOI: <https://doi.org/10.1002/9781119236016.ch15>
- 12) Yuji Ichikawa, Kazuhiro Ogawa, Critical Deposition Condition of CoNiCrAlY Cold Spray Based on Particle Deformation Behavior, *Journal of Thermal Spray Technology*, Vol. 26, Issue 3, pp. 340–349, 2017.
- 13) Ichikawa, Y., Horiuchi, S., Ogawa, K., Oikawa, M., Tatsuki, T., Yamazaki, H., Microstructural change and delamination resistance of the thermal barrier coatings with cold sprayed Ce-content bond coats, *Zairyo (Journal of the Society of Materials Science, Japan)*, Vol. 66, No. 2, pp. 142-149, 2017.

- 14) Ichikawa, Y., Tokoro, R., Ogawa, K., Micro-scale strength evaluation for bonding interface of cold sprayed coatings, *Materials Science Forum*, Vol. 879, pp. 795-800, 2017.
- 15) 小川和洋, コールドスプレー法を用いたガスタービン高温部材補修の可能性, *日本ガスタービン学会誌*, Vol.45, pp.470-475, 2017.
- 16) 小川和洋, 優れた耐はく離性を有する遮熱コーティング, *日本材料科学学会誌*, Vol.55, pp.6-9, 2018.
- 17) 小川和洋, 柳岡遼太郎, サスペンションプラズマ溶射法による耐環境セラミックコーティング成膜技術の開発, *機能材料*, Vol.38, No.7, pp.38-48, 2018.
- 18) Toru Amaya, Toshio Yonezawa, Kazuhiro Ogawa, Mikko. J. Peltonen, Hannu hänninen, Solidification Cracking Mechanism of Carbon Steel Weld Metal, *Welding Journal*, Vol.97, No.2, pp. 55-64, 2018.
- 19) Tsuyoshi Shiozaki, Naoki Yamaguchi, Yoshikiyo Tamai, Jiro Hiramoto, Kazuhiro Ogawa, Effect of weld toe geometry on fatigue life of lap fillet welded ultra-high strength steel joints, *International Journal of Fatigue*, Vol.116, pp. 409-420, 2018.
- 20) K. Ravi, T. Deplancke, K. Ogawa, J.-Y. Cavaillé, O. Lame, Understanding Deposition Mechanism in Cold Sprayed Ultra High Molecular Weight Polyethylene Coatings on Metals by Isolated Particle Deposition Method, 2018, *Additive Manufacturing*, Vol. 21, 191-200. <https://doi.org/10.1016/j.addma.2018.02.022>
- 21) C.A.Bernard, T.Deplancke, O.Lame, K.Ogawa, J.-Y.Cavaillé, Three-dimensional constitutive model for the description of high molecular weight semicrystalline polymers over a large range of temperatures and strain rates: Application to Ultra High Molecular Weight PolyEthylene, *EPJ Web of Conferences*, Volume 183, 7 September 2018, DOI: 10.1051/epjconf/201818301016
- 22) Y.Ichikawa, R.Tokoro, M.Tanno, K.Ogawa, Elucidation of Cold-Spray Deposition Mechanism by Auger Electron Spectroscopic Evaluation of Bonding Interface Oxide Film, *Acta Materialia*, Vol.164, pp.39-49, 2019. <https://doi.org/10.1016/j.actamat.2018.09.041>
- 23) KesavanRavi, Wesley LockSulen, ChrystelleBernard, Yuji Ichikawa, Kazuhiro Ogawa, Fabrication of micro-/nano-structured super-hydrophobic fluorinated polymer coatings by cold-spray, *Surface and Coatings Technology*, Vol. 373, pp. 17-24, 2019, <https://doi.org/10.1016/j.surfcoat.2019.05.078>
- 24) Kesavan Ravi, Tiana Deplancke, Olivier Lame, Kazuhiro Ogawa, Jean-Yves Cavaillé, Florent Dalmas, Influence of nanoceramic interlayer on polymer consolidation during cold-spray coating formation, *Journal of Materials Processing Technology*, Vol. 273, November 2019, 116254, <https://doi.org/10.1016/j.jmatprotec.2019.116254>
- 25) K.Okuda, K.Ogawa, Y.Ichikawa, T.Shiozaki, N.Yamaguchi, Influence of microstructure on fatigue property of ultra high-strength steels, *Frattura ed Integrita Strutturale*, Vol. 13, Issue 48, April 2019, pp. 125-134. DOI: 10.3221/IGF-ESIS.48.15
- 26) Y.Chai, X.Yang, Y.Li, K.Ogawa, Stress development in thermal barrier coatings with morphology-controlled thermally grown oxide, *Ceramics International*, 2019, DOI: 10.1016/j.ceramint.2019.07.020
- 27) Manap, A., Okabe, T., Ogawa, K., Mahalingam, S., Abdullah, H., Experimental and smoothed particle hydrodynamics analysis of interfacial bonding between aluminum powder particles and aluminum substrate by cold spray technique, *International Journal of Advanced Manufacturing Technology*, Vol. 103, Issue 9-12, 2019, pp. 4519-4527.
- 28) Lock Sulen, W., Ravi, K., Bernard, C., Mary, N., Ichikawa, Y., Ogawa, K., Effects of nano-ceramic particle addition for cold sprayed fluoropolymer coatings, *Key Engineering Materials*, Vol. 813, pp. 141-146, 2019.

Total 131 journal papers + 17 tutorial papers

PATENTS

Patent-pending 14

Patent-holding 8

PROJECTS

- JSPS KAKENHI Challenging Research (2016-2018) No. 16K14109
- JSPS KAKENHI Grant-in-Aid for Scientific Research A (2017-2019) No. 17H01235
- Program for Fundamental Research and Human Resources Development towards the Decommissioning of Nuclear Power Plants (2014-2018)
- 10 collaboration projects between companies on 2019

SUPERVISED STUDENTS in 2018

Undergraduate students
8 students

Master students:
5 students

Doctoral students
6 students

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