Sreedhar Unnikrishnakurup

Postdoctoral Fellow, Indian institute of Technology Madras

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https://scholar.google.com/citations?user=rgeu6SAAAAAJ&hl=en

WORK EXPERIENCE

Senior Project Officer

Centre for Non-Destructive Evaluation (CNDE), IIT Madras

May 2018–Ongoing — Chennai, India

- Application of Nondestructive evaluation techniques and deep learning models for thickness inspection of thermal barrier coatings
- Online monitoring of CMT welding process for defect detection using infrared thermal imaging
- Online inspection of cracks in continuous cast steel billets using infrared thermography
- Development of artificial intelligence assisted advanced radiography imaging and automatic defect recognition of critical welds in ship industry

Cohort Member BA3

Entrepreneur First

February 2020 - May 2020 — Bangalore, India

- Explored several interesting technological solutions, exploring the market, validating the technology, speaking to customers, and researching prototypes
- The ideas that we worked on are detect and report quality-compromised and counterfeit drugs using a mobile cloud-based cost-effective hyper-spectral Imaging based AI device

Postdoctoral Research Scientist

NDT group 8.7, Federal Institute for Material Research and Testing (BAM)

January 2016 - June 2017 — Berlin, Germany

- European Metrology Research Programme (EMRP) Validated Inspection Techniques for Composites in Energy applications (Collaborative project between institutes from UK, France, Germany and Czech Republic)
- Development of computational simulations to study the active thermographic testing for defect detection in composites
- Optimize and validate active thermography as full-field, fast and non-contact NDE technique for quantitative testing of FRP structures

Visiting Research Scientist

Electromagnetic NDT Research Group, West Pomeranian University (ZUT)

January 2015 - June 2015 — Szczecin, Poland

- Terahertz imaging and time domain analysis for material defect identification in Composite Wind turbine blades
- Active Infrared Thermography for defect identification in composite materials - Numerical investigations of heat sink effects in the infrared inspecton of composites
- Supported by European Commission Project HEMOW: health monitoring of offshore wind farms

Institute Postdoctoral Fellow

Centre for Non-Destructive Evaluation (CNDE), IIT Madras

September 2014 - December 2015 | Chennai, India

- Numerical modelling of microstructural heat diffusion and ultrasonic wave propagation in Polycrystalline Materials (Voronoi cell based finite element modeling): Funded project from Board of Research for Nuclear Science in India
- CMT welding process monitoring using IR thermography. Collaborative research with Metallurgy and Materials department of IIT Madras
- In-line laser thermography for Online Monitoring of steel billets to predict the surface cracks formed during the non-uniform cooling in collaboration with BAM Berlin and financially supported by Indo-German Science and Technology Centre (IGSTC)

Research Associate

Centre for Non-Destructive Evaluation (CNDE), IIT Madras

April 2007 - December 2008 | Chennai, India

- Worked on a joint project between IIT Madras and ISRO (Indian Space Research Organization) for the development of online weld quality monitoring for AA2219 liquid propellant tanks using Infrared Thermal Imaging technique
- Developed a finite element model for the prediction of temperature profiles during welding
- Thermo-mechanical behaviour of materials (composites, ferrous alloys) during different loading conditions using passive thermal imaging

EDUCATION

Ph.D. in Mechanical Engineering

University of Montpellier 2 (CNRS)

2011 - 2014 | Montpellier, France

- Dissertation Topic: Weld pool shape identification using Multi-physics modelling and Experiments
- Advisors: Prof. Gilles Fras, Dr. Sebastien Rouquette and Dr. Fabien Soulie

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M.S. in Mechanical Engineering

Indian Institute of Technology Madras

2008 - 2010 | Chennai, India

- Dissertation Topic: Online weld quality monitoring using Infrared Thermal Imaging
- Advisors: Prof. Krishnan Balasubramaniam and Dr. C. V. Krishnamurthy
- Cumulative Grade Point Average 8 out of 10

AMIE in Mechanical Engineering

Institution of Engineers India

2002 - 2006 | Kottayam, India

- Cumulative Grade Point Average 6.94 out of 10

PUBLICATION

Dissertations

1. Unnikrishnakurup Sreedhar. *Static GTAW: experimental and numerical investigations and heat flux parameter estimation*. PhD thesis, Universite Montpellier-II, Montpellier, France, 2014. URL `https://bit.ly/2UFQyFi`
2. Sreedhar Unnikrishnakurup. Online weld quality monitoring using infrared thermal imaging. Master's thesis, Indian Institute of Technology Madras, Chennai, India, 2011

Journal Articles

1. Nithin Puthiyaveettil, K Renil Thomas, Sreedhar Unnikrishnakurup, Philipp Myrach, Mathias Ziegler, and Krishnan Balasubramaniam. Laser line scanning thermography for surface breaking crack detection: modeling and experimental study. *Infrared Physics & Technology*, 104:103141, 2020. URL `https://bit.ly/2YvQJ7h`
2. V Nithin, P, Thomas K, Renil, Unnikrishnakurup Sreedhar, Rajagopal Prabhu, Phani Prabhakar K, V, Padmanabham G, and Balasubramaniam K. Numerical model and experimental validation for the on-line monitoring of cold metal transfer joining of aluminium to galvanized steel. *International Journal of Advanced Manufacturing Technology*, 104:4365–4375, 2019. URL `https://bit.ly/2AnbYQF`
3. Christiane Maierhofer, Rainer Krankenhagen, Mathias Roellig, Sreedhar Unnikrishnakurup, Christian Monte, Albert Adibekyan, Berndt Gutschwager, Lenka Knazowicka, Ales Blahut, Mike Gower, et al. Influence of thermal and optical material properties on the characterization of defects in fiber reinforced composites with active thermography methods. *tm-Technisches Messen*, 85(1):13–27, 2018. URL `https://bit.ly/3hswSOI`
4. Sreedhar Unnikrishnakurup, Sébastien Rouquette, Fabien Soulié, and Gilles Fras. Estimation of heat flux parameters during static gas tungsten arc welding spot under argon shielding. *International Journal of Thermal Sciences*, 114: 205–212, 2017. URL `https://bit.ly/3d10rnl`
5. K Renil Thomas, Sreedhar Unnikrishnakurup, PV Nithin, Krishnan Balasubramaniam, Prabhu Rajagopal, KV Phani Prabhakar, G Padmanabham, Frank Riedel, and Markus Puschmann. Online monitoring of cold metal transfer (cmt) process using infrared thermography. *Quantitative InfraRed Thermography Journal*, 14(1):68–78, 2017. URL `https://bit.ly/2zyzWrI`
6. U Sreedhar, CV Krishnamurthy, and K Balasubramaniam. Monitoring tig welding using infrared thermography–simulations and experiments. *Przegląd Elektrotechniczny*, 92(4):6–9, 2016. URL `https://bit.ly/2UGtp5I`
7. U Sreedhar, CV Krishnamurthy, Krishnan Balasubramaniam, VD Raghupathy, and S Ravisankar. Automatic defect identification using thermal image analysis for online weld quality monitoring. *Journal of Materials Processing Technology*, 212(7):1557–1566, 2012. URL `https://bit.ly/3d5JMiA`

Conference Presentations

- Complete list of conference publication URL: https://bit.ly/30BlL05

RESEARCH INTEREST

With in the field of mechanical engineering and material Science, my research interests span the areas of Nondestructive Testing and Evaluation particularly in Infrared Thermal Imaging and X-ray radiography, Welding process, Online monitoring, Hyperspectral Imaging, Ray Tracing, Computational modeling, Microstructural based material modeling, Data driven scientific computing, Deep learning and Machine Learning.

SKILLS

- ●●●●● MATLAB
- ●●●●○ Python
- ●●●○○ Numpy
- ●●○○○ Pandas
- ●○○○○ R

- ●●●●● COMSOL
- ●●●●○ ANSYS
- ●●●●○ LaTeX
- ●●●○○ Git
- ●●○○○ Scikit-learn

- ●●●●● Deep learning
- ●●●●○ Computer vision
- ●●●●○ Pytorch
- ●●●○○ Tensorflow
- ●○○○○ Keras

LANGUAGES

English	●●●●●	Malayalam	●●●●●
German	●●●○○	Hindi	●●●○○
French	●●○○○	Tamil	●●○○○

ACHIEVEMENTS AND MEMBERSHIPS

- Life member of Indian Society for Non-destructive Testing (ISNT)
- Visiting Researcher fellowship under European Commission Project HEMOW: health monitoring of offshore wind farms
- Awarded French research allowance by University of Montpellier 2 for carrying out Ph.D., 2011
- Achieved Chartered Engineer status by becoming a member of the Institution of Engineers India (CEng), 2012
- Associate Member of Institution of Engineers India (AMIE)
- Qualified in Graduate Aptitude Test for Engineers GATE 2007

CERTIFICATIONS AND COURSES

- Deep Learning, a 5-course specialization by deeplearning.ai on Coursera. Specialization Certificate earned on September 23, 2018
- Winter School on Artificial Intelligence, Infosys Center for Artificial Intelligence at IIIT Delhi 18-21st Jan, 2019
- Fundamentals of Data Science & Deep learning course, PadhAI, One fourth labs, IIT Madras (Ongoing, June 2020)

INVITED PRESENTATIONS

- Preconference Tutorials, NDE 2019 Organized by Indian Society for Non-Destructive Evaluation ISNT, Talk: Applications of thermal imaging in aerospace industry, Bengaluru, December 3, 2019
- Workshop on Advanced NDE Techniques and Applications organized by TATA STEEL, Talk: Advanced Thermography Techniques, TATA Nagar, Jamshedpur, India, August 17, 2015
- Polish society for theoretical and applied electrical engineering section in Szczecin (PTETiS), Talk: Research and Development in the field of NDE @ CNDE, West Pomeranian University of Technology, Szczecin, Poland, March 12, 2015
- Polish society for nondestructive testing and technical diagnostic section in Szczecin (PTBNiDT), Talk: Research and Applications of IR Thermography @ CNDE, Szczecin, Poland, February 26, 2015

REVIEWING AND MENTORING

- International journal of thermal science, Sensors, Transactions of Indian Institute of Metals, Measurement Science and Technology
- 5 Ph.D. Students and 4 Master student

REFERENCES

Prof. Krishnan Balasubramaniam

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🏛 Department of Mechanical Engineering, IIT Madras

Dr. Fabien Soulie

@ fabien.soulie@umontpellier.fr
🏛 UM2/LMGC

Dr. Christiane Maierhofer

@ christiane.maierhofer@bam.de
🏛 BAM Division-8.7, Berlin

Dr. Sebastien Rouquette

@ sebastien.rouquette@umontpellier.fr
🏛 UM2/LMGC

Dr. C. V. Krishnamurthy

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🏛 Department of Physics, IIT Madras