

Dr. Maya Katapadi Kini

*Assistant Professor, Materials Engineering,
Indian Institute of Technology Jammu,
Jagti, NH 44, Nagrota, Jammu (J & K) -181221*

maya.kini@iitjammu.ac.in

kini.mayakatapadi@gmail.com

Research Gate ID: [Maya Katapadi Kini](#)

Google Scholar ID: [Maya Katapadi Kini](#)

Research Interests (Current and past)

Thin film mechanics
Nanotwinned metals, dislocation – coherent twin boundary interaction
Micromechanical testing
Thermal stresses and thermomechanical deformation – dislocation plasticity, thermomechanical fatigue and diffusion creep
Thin film deposition and characterization
Bulk high temperature deformation – diffusion creep and grain boundary sliding
Diffusional processes in ceramics
Processing and densification of ceramics
Interfaces and anisotropy in ceramics
Basics of microwave and electric field assisted sintering

Education

Ph.D (February 2017)

Department of Materials Engineering, Indian Institute of Science, Bangalore, India

Thesis title: **Interfacial processes in densification of cubic zirconia**

<https://etd.iisc.ac.in/handle/2005/3158>

M.E (Masters degree) in Materials Engineering (2009)

Department of Materials Engineering, Indian Institute of Science, Bangalore, India

CGPA: 7.7 / 8.

Project title: **High Temperature Deformation Behaviour of Titania Doped 3 mol% Ytria Stabilized Tetragonal Zirconia**

B. Tech in Metallurgical and Materials Engineering (2007)

National Institute of Technology Karnataka, Surathkal, India

CGPA: 9.19 / 10.0

Project title: **Influence of Austempering Parameters on the Microstructure and Properties of Austempered Ductile Iron**

Academic awards and honors

1. Letter of appreciation for outstanding invited talk in the national e-workshop on “Surface characterization: tools and application (SCTA 2020)” organized by NITK, Surathkal in December 2020.
2. Fellowship of the Max Planck Society for post-doctoral research from August 2016 to July 2018.
3. DST-ITS travel grant for attending 12th International Conference on Ceramic Processing Science in 2013.
4. Selected for ‘Women in Technology and Science Meet’ (WITS)’ - India at John F. Welch Technology Centre at GE Global Research, Bangalore in 2011.
5. K.K. Malik medal by The Council, IISc, Bangalore for the best M.E. student in Materials Engineering for the years 2008-09.
6. NITK medal for first position in B.Tech in Metallurgical and Materials Engineering at NITK, Surathkal in 2007.
7. All India ranks of 4th and 35th in GATE in the years 2007 and 2006 respectively.

Journal Publications

1. **“Nanocrystalline equiatomic CrFeCoNi alloy thin films: Are they single phase fcc?”**, Maya K. Kini, Subin Lee, Alan Savan, Benjamin Breitbart, Younes Addab, Wenjun Lu, Matteo Ghidelli, Alfred Ludwig, Nathalie Bozzolo, Christina Scheu, Dominique Chatain, Gerhard Dehm, *Surface Coat. Tech.* 410 (2021) 126945
doi: <https://doi.org/10.1016/j.surfcoat.2021.126945>
2. **“Microstructure evolution, dewetting, and orientation relationship of equiatomic CoCrFeNi thin films deposited on (0001) α -Al₂O₃”**, Y. Addab, M. K. Kini, B. Courtois, A. Savan, A. Ludwig, N. Bozzolo, C. Scheu, G. Dehm and D. Chatain, *Acta Materialia*, 200 (2020) 908 – 921
doi: <https://doi.org/10.1016/j.actamat.2020.09.064>
3. **“Dislocation plasticity and detwinning under thermal stresses in nanotwinned Ag thin films”**, Maya K. Kini, C. Merola, B. Breitbart, D. Klapproth, B. Philippi, J-B. Molin, C. Kirchlechner and G. Dehm, *Acta Materialia*, 198 (2020) 61 – 71
doi: <https://doi.org/10.1016/j.actamat.2020.07.056>
4. **“Initial stage sintering of polycrystalline spheres: A model and experiments”**, Maya K. Kini and Atul H. Chokshi, *Materialia*, 10 (2020) 100665
doi: <https://doi.org/10.1016/j.mtla.2020.100665>
5. **“Size dependent strength, slip transfer and slip compatibility in nanotwinned silver”**, Maya K. Kini, Gerhard Dehm and Christoph Kirchlechner, *Acta Materialia*, 184 (2020) 120- 131
doi: <https://doi.org/10.1016/j.actamat.2019.11.042>
6. **“Grain boundary crystallography in polycrystalline yttria stabilized cubic zirconia”**, Maya K. Kini, *Philosophical Magazine*, 98 (2018) 1865 – 1883
doi: <https://doi.org/10.1080/14786435.2018.1464677>
7. **“Influence of Titania on Creep in Superplastic Zirconia”**, Maya Kini and Atul H. Chokshi, *Journal of the American Ceramic society*, 93 (2010) 1725 -1731
doi: <http://dx.doi.org/10.1111/j.1551-2916.2010.03617.x>

Conference Proceeding

8. “Creep in TiO₂ Doped Zirconia: Implications for High Strain Rate Superplasticity”, Maya Kini and Atul H. Chokshi, Proceedings of 15th international conference on strength of materials (ICSMA-15), Journal of Physics conference series, 240 (2010) 012151
doi: <http://dx.doi.org/10.1088/1742-6596/240/1/012151>

Conference presentations (Oral and poster)

1. Poster presentation on “Size scaling and strain rate sensitivity for ideal slip transmission in nanotwinned Ag” in Schoental symposium on dislocation based plasticity at Schoental, Germany in March 2020.
2. Oral presentation on “Slip transmission in nanotwinned Ag under mechanical and thermomechanical loading” in the conference “Nanobruucken 2020” at MPIE, Dusseldorf, Germany in February 2020.
3. Oral presentation on “On microstructural constraints for slip transfer in nanotwinned silver” at the ECI conference on Nanomechanical testing at Malaga, Spain in September – October 2019.
4. Oral presentation on “Microstructure and thermo-mechanical properties of CrFeCoNi equiatomic compositionally complex alloy thin films” at International symposium on metastable, amorphous and nanostructured materials at Chennai, India in July 2019.
5. Oral presentation on “First results on phase stability, microstructure and thermomechanical behavior of CrFeCoNi thin films” in MSE Congress in Darmstadt, Germany in September 2018
6. Oral presentation on “Deformation of nanotwinned Ag by micropillar compression” in EMRS spring meeting in Strassbourg, France in June 2018
7. Oral presentation on “Modeling and experiments on initial stage sintering of polycrystalline spheres” in International conference on ceramics and advanced materials for energy and environment at Christ university, Bangalore in 2015.
8. Oral presentation on “Grain boundary crystallography in polycrystalline yttria stabilized cubic zirconia with varying densities and grain sizes” in UGC-NRCM workshop on interface related mechanical behaviour of materials –II at IISc, Bangalore in 2015.
9. Oral presentation on “Grain boundary crystallography in cubic zirconia with varying densities and grain sizes” in International conference on Sintering – 2014 held at Dresden, Germany in 2014.
10. Poster presentation on “Role of grain boundaries in initial stage sintering of polycrystalline zirconia spheres” in 12th International conference on ceramic processing science (ICCPS-12) held at Portland, Oregon, USA from in 2013.
11. Attended 16th International conference on strength of Materials (ICSMA – 16), 2012, Indian Institute of Science, Bangalore.
12. Poster presentation on “Distribution of coincidence site lattice (CSL) grain boundaries in polycrystalline zirconia” at the International workshop on advanced ceramics for future (ACF – 12), 2012, Indian Institute of Science Madras (IITM), Chennai, India
13. Attended International Spring School on Field Assisted Sintering Techniques (FAST), 2011 at Technische Universitat Darmstadt, Darmstadt, Germany.

14. Poster presentations in workshops on Interface Related Mechanical Behavior of Materials organized by UGC- NRCM (University Grants commission- Networking resource centre for materials) at IISc, Bangalore in 2012 and 2009. Attended summer schools on mechanical behavior of materials and structural characterization in 2009 -2011.
15. Poster presentation in the session on mechanical behavior of materials at NMD – ATM (National Metallurgist’s day- Annual Technical Meeting) held at IISc, Bangalore in 2010.

List of invited and seminar talks

1. Invited talk on “Thin film stresses, plasticity and thermomechanical fatigue” in the Surface characterization: Tools and Applications 2020” workshop at NITK, Surathkal, India.
2. Seminars on “Slip transmission in nanotwinned Ag” in IISc, Bangalore, India and IIT Bombay, Mumbai, India in April 2019.
3. Seminar on “First results on phase stability, microstructure and thermomechanical behavior of CrFeCoNi thin films” in Eric Schmid Institute, Leoben, Austria in November 2018
4. Talk on “Phase stability, microstructure and thermomechanical deformation of equiatomic CrFeCoNi thin films” at Marseille, France in May 2018.
5. Talks in in-house retreats of the Structure and Nano/- Micromechanics of materials, MPIE, Dusseldorf in the years 2017 to 2020.
6. Presentations in in-house Annual students’ symposiums at Department of Materials Engineering, IISc in the years 2008 - 2014.
7. Talks on high temperature deformation in ceramics and sintering at Materials Advantage student chapter at IISc, Bangalore in 2010-12.

Technical skills including software

1. Materials characterization:

Scanning Electron Microscopy (SEM),
Electron Back Scattered Diffraction (EBSD),
Electron Channeling contrast imaging (ECCI),
Focused Ion Beam machining (FIB),
Atomic Force Microscopy (AFM),
X-Ray diffraction (XRD),
Synchrotron X-Ray diffraction,
Optical microscopy (OM),
Thermogravimetry-Differential thermal analysis (TG-DTA),
Basics of conventional TEM diffraction (SAD) and imaging analysis

2. Mechanical properties:

In situ micropillar compression tests,
Thermal stresses by wafer curvature measurements,
Thermal fatigue of thin films,
Creep testing (bulk),

Constant displacement rate testing (bulk - Instron),
Nanoindentation.

3. **Thin film deposition:**

Physical vapor deposition (E-Beam evaporation)

4. **Ceramic Processing:**

Sintering and sinterforging,

Microwave and DC electric field assisted processing,

Nano powder synthesis by solution route,

Gel casting.

5. **Programming:** Basics of C programming, Matlab, Wolfram Mathematica, technical writing using LaTeX.

6. **Software:** TSL-OIM data acquisition and analysis, XPert Highscore, Beartex, Mtex, Crystallmaker (Demonstration version), Origin, ImageJ, Inkscape, Gwyddion, MS office, Endnote, Adobe acrobat, Baraha (Indic keyboard)

Research experience (apart from PhD)

- Post-doctoral researcher working for ERC project “GB CORRELATE” at Max Planck institute for Iron Research, Dusseldorf, Germany – from August 2020 to January 2021.
- Post-doctoral researcher working for a DFG – ANR German- French collaborative project “Analysis of the thermal stability of the High Entropy Alloys by Dewetting of thin films (AHEAD)” at Max Planck institute for Iron Research, Dusseldorf, Germany – from August 2018 to July 2020.
- Post-doctoral researcher with a fellowship from the Max Planck society at the MPIE, Dusseldorf, Germany from August 2016 to July 2018

Notable research assignments

1. In charge for wafer curvature measurement set up (custom built, kSA MOS), MPIE, Dusseldorf from October 2016 to December 2019. Involved in upgrading the set up to higher temperatures and higher vacuum levels.
2. Department in charge for physical vapor deposition cluster (BESTEC, Germany) at Structure and Nano/-Micromechanics department, MPIE, Dusseldorf from August 2016 until the establishment of a thin film group in November 2018.
3. Installation and in charge of infrared oven (Behr, Germany) for rapid thermal fatigue at MPIE, Dusseldorf in 2019.
4. In charge for custom made heating set up at MPIE, Dusseldorf from August to December 2019.
5. Establishment of EBSD for fine grained non-conducting oxides and porous oxides at IISc, Bangalore from January 2010 to August 2014.
6. In charge for high temperature annealing and testing facilities (Thermolyne box furnace–working up to 1973 K) furnace, ATS creep testing machine (working up to 1873 K), microwave sintering furnace (custom built – Enerzi microwave systems, India) in the years 2009 to 2016.

7. Installation of an Ar inert atmosphere set up for a high temperature creep testing machine (ATS operating up to 1773 K) at IISc, Bangalore in 2014 to 2015.
8. Installation of a high speed cutting machine (MTI Corporation, USA) at IISc, Bangalore in October 2011. Upgradation of the Struers high speed saw (Struers, Denmark) at IISc, Bangalore in March 2011.

Notable teaching assignments

1. Tutorial, lab sessions on thin film mechanics in the “small scale mechanical testing” course at the Ruhr university, Bochum in the years 2017 to 2019.
2. Practical session on Thin film mechanics by wafer curvature measurements in Summer school on experimental Nano-/Micromechanics held at Dusseldorf, Germany in 2017.
3. Teaching assistant for Bachelor of Science (BS) at IISc, Bangalore for the course on “Introduction to Materials Science” in January to April 2013, for post-graduate and research students for the term August to December 2013.
4. Lab Instructor for quantitative microscopy and Scanning Electron Microscopy (SEM) in UGC-NRCM workshops on structural characterization techniques in Materials Science in the years 2009 - 2011.

Student co-supervision

1. Internship – 1 (at MPIE, Dusseldorf in 2019)
2. PhD student – 1 (at IISc, Bangalore in 2014 - 2016)
3. Masters’ student – 1 (at IISc, Bangalore in 2014 – 2015)

Reviewing experience

Acta Materialia, Philosophical magazine, Journal of Materials Science, SICE conference proceedings

Organizational experiences

1. A volunteer for the conference Nanobruecken at Dusseldorf in February 2020 and a workshop on Nano-/Micromechanics at Dusseldorf in September 2017.
2. In charge for in house seminar talks in the micromechanics department, MPIE, Dusseldorf in 2017.
3. Student in charge for the departmental library committee at IISc, Bangalore in the years 2012 to 2013, volunteer from 2013 - 2014.
4. Student member of registration and abstract committee for the 16th International conference on strength of Materials (ICSMA -16), in 2012, IISc, Bangalore.
5. Demonstrations and posters (in English and Kannada languages) on basics of microstructure and materials science for school students at the open day, in 2011- 2012, IISc, Bangalore.
6. Student member of abstract committee for National Metallurgist’s Day - ATM held by Indian Institute of Metals at IISc, Bangalore in 2010.
7. Member of organizing committee in Annual students’ symposium and Open day at Materials Engineering, IISc in 2008 – 12

8. Member of a group on Mechanical behavior at Materials engineering, IISc, Bangalore during 2008 to 2013.

Short term projects/short term industrial experience:

1. "Preliminary Studies on Gelcasting of Alumina Ceramics" at National Aerospace Laboratories, Bangalore during May to July 2006.
2. Industrial training at Foundry and Forge division, Hindustan Aeroautics Limited (HAL) as a part of B. Tech. curriculum in June 2005.

Non-academic interests

Embroidery and crochet, reading and writing in Kannada, walking in the Nature, visiting natural and historical places, listening to Indian classical instrumental music, cycling, a bit of yoga and meditation, a bit of gardening, learnt Indian classical dance (Bharatanatyam) and basics of Carnatic music in the past, occasionally helped disabled and elderly persons in the past