Omer MUŠIĆ, Asst. Prof. Dr.

Mechanical Engineering Department, TED University
Ziya Gokalp Cad. No. 48, 06420 Cankaya, Ankara, Turkey
E-mail: omer.music@tedu.edu.tr
Tel: +90 312 585 0283 (Office)

Summary of qualifications

Bachelor and Master's degree in Mechanical Engineering, focusing on metal forming

PhD in Engineering, focusing on flexible, sustainable metal forming processes

Six years of research experience in industry

Six years of experience in academic research

Teaching for six years at both undergraduate and graduate level

1. Education

2001 **B.Sc. in Mechanical Engineering**
Mechanical Engineering Department
Middle East Technical University, Ankara/Turkey

2005 **M.Sc. in Mechanical Engineering**
Advisor: Prof. Dr.-Ing. A. Erman Tekkaya
Mechanical Engineering Department
Middle East Technical University, Ankara/Turkey

Thesis topic: "Analysis of the Cold Ring Rolling Process". Analysis and improvement of a metal forming process at a bearing manufacturing factory.

2011 **PhD in Engineering**
Advisor: Prof. Dr. Julian Allwood
Department of Engineering
University of Cambridge / U.K.

Thesis topic: "Flexible Asymmetric Spinning". Following a detailed numerical and experimental analysis of the traditional metal forming processes, a novel flexible forming process – Asymmetric Flexible Spinning was proposed. The process allows production of axisymmetric and non-axisymmetric sheet metal components using a set of simple tools rather than conventional dies. To test the concept, a full scale seven-axis CNC machine has been designed, manufactured, and used to successfully produce trial parts, leading to a patent application.

2. Experience

2001-2007 **Research Engineer (Chief Research Engineer from Jan. 2006)**
Research Group, Engineering Dep.
ORS Bearings, Ankara/Turkey

Responsibilities:

- Analysis, evaluation and improvement of metal forming processes used in production of ball bearings, using analytical, experimental and numerical methods.
- Measurement and analysis of residual stresses and retained austenite in bearing rings by the X-Ray Diffraction method.
- Analysis and evaluation of the effect of residual stresses on bearing fatigue life.
- Management of a number of small and large scale research projects, including internally funded projects, projects funded by the Turkish Government (TUBITAK) and EU 6th Framework projects.

2. Experience (continued)

2007-2011	**PhD student, Undergraduate teaching assistant and supervisor** Department of Engineering University of Cambridge, U.K.
2012-2014	**Senior Researcher** Metal Forming Centre of Excellence Atılım University, Ankara, Turkey
2012-2013	**Instructor** Manufacturing Engineering Department Atılım University, Ankara, Turkey
2013-2017	**Assistant Professor** Manufacturing Engineering Department Atılım University, Ankara, Turkey
2014-2017	**Executive Board Member** Metal Forming Centre of Excellence Atılım University, Ankara, Turkey
2014-2017	**Academic adviser** Technology transfer office Atılım University, Ankara, Turkey
2017-present	**Assistant Professor** Mechanical Engineering Department TED University, Ankara, Turkey

3. Awards

Invited talks

Professional activities

International Karl-Kolle Prize for Metal Forming	Awarded by the German Metal Forming Association (Arbeitsgemeinschaft Umform-technik) in recognition of "application oriented innovative outstanding research achievements in the field of metal forming".
Outstanding PhD dissertation award	Awarded by the Department of Engineering, University of Cambridge, UK.
Ford University Research Programme Award	Ford Motor Company, U.S.: funding for PhD studies.
Dorothy Hodgkin Postgraduate Award	Engineering and Physical Sciences Research Council/Dorothy Hodgkin Postgraduate Award: funding for PhD studies
Career Development Award, Scientific and Technological Research Council of Turkey	Awarded by the Scientific and Technological Research Council of Turkey, this award provides funding for 'academic leaders of the 21st century'.
Elsevier Publishing, Journal of Materials Processing Technology	Top reviewer award in 2009, 2010 and 2011.
Japan Society for Technology of Plasticity	Invited young researcher at the International Seminar on Precision Forging in Kyoto.
Sheffield Metallurgical Association (SMA)	Invited speaker at the annual SMA conference.

3. Awards

Invited talks

Professional activities

Member of the Scientific Committee and/or session chairman	10th International Conference on Technology of Plasticity,2011, Germany
	11th International Conference on Technology of Plasticity, 2014, Japan
	12th International Conference on Numerical Methods in Industrial Forming Processes, 2016, France
	35th International Deep Drawing Research Group Conference, 2016, Austria.
	12th International Conference on Technology of Plasticity, 2017, U.K.
	36th International Deep Drawing Research Group Conference, 2017, Germany.
Reviewer	Journal of Materials Processing Technology (Elsevier)
	Materials Science and Engineering A (Elsevier)
	ASME Journal of Manufacturing Science and Engineering (ASME).

4. Patents

1. Julian M. Allwood, Omer Music, 2013:Spin forming process and apparatus for manufacturing articles by spin forming, U.S. Patent, 20130152652A1, Filed 2011-09-29, Publication 2011-09-29.
2. Julian M. Allwood, Omer Music, 2013:Spin forming process and apparatus for manufacturing articles by spin forming, European Patent, EP2621647A1, Filed 2011-09-29, Publication 2013-08-07.
3. Julian M. Allwood, Omer Music, 2013:Spin forming process and apparatus for manufacturing articles by spin forming, JP5838214B2, Japan patent, Filed 2011-09-29, Publication 2016-01-06.
4. Julian M. Allwood, Omer Music, 2013:Spin forming process and apparatus for manufacturing articles by spin forming, China Patent, CN103108709, Filed 2011-09-29, Publication 2013-05-15.

5. Languages

Bosnian/Serbo-Croatian	Mother tongue
English	Fluent (IELTS overall score: 8.5/9)
Turkish	Fluent

6. Publications list (in chronological order)

A total of 227 citations since 2011.

6.1 Journals:

1. *J. M. Allwood, R. Kopp, D. Michl,* ***O. Music****, M. Oztop, T. F. Stanistreet, A. E. Tekkaya, I. Tiedemann:* The Technical and Commercial Potential of an Incremental Ring Rolling Process, *CIRP Annals - Manufacturing Technology*, Volume 54, Issue 1, 2005, Pages 233-236.

2. *J. M. Allwood,* ***O. Music****, A. Raithathna, S. R. Duncan:* Closed-loop feedback control of product properties in flexible metal forming processes with mobile tools, *CIRP Annals - Manufacturing Technology*, Volume 58, Issue 1, 2009, Pages 287-290.

3. ***O. Music****, J.M. Allwood, K.-I. Kawai:* Review of mechanics of spinning, *Journal of Materials Processing Technology*, Volume 210, Issue 1, 2009, Pages 3-23.

4. *J.M. Allwood, D. Braun,* ***O. Music****:* The effect of partially cut-out blanks on geometric accuracy in incremental sheet forming, *Journal of Materials Processing Technology*, Volume 210, Issue 11, Pages 1501-1510.
5. ***O. Music****, J.M. Allwood:* Flexible Asymmetric Spinning, *CIRP Annals – Manufacturing Technology*, Vol. 60/1, Pages 319-322, 2011.

6. ***O. Music****, J.M. Allwood:* Tool-path design for metal spinning, Special edition of Steel Research International (*International Conference on Technology of Plasticity)*, Aachen, 2011.

7. ***O. Music****, J.M. Allwood*: The use of spatial impulse responses to characterise flexible forming processes with mobile tools, *Journal of Materials Processing Technology*, Vol. 212/5, Pages 1139-1156, 2012.

8. Hava Hüyük, **Omer Music**, Asuman Koç, Celalettin Karadoğan, Çağdaş Bayram, Analysis of Elastic-plastic Interference-fit Joints, "Procedia Engineering ", 81, (Elsevier), Ken-Ichiro Mori, pg.2030-2035, (2014)

6.2 Book chapters:

1. **O. Music**: "Shear Spinning" Chapter, in "Encyclopaedia of production engineering", Academy of Production Engineering (CIRP), Springer Reference, 2014.

2. **O. Music**: "Flexible Asymmetric Spinning" Chapter, in "60 Excellent inventions in metal forming", Springer Vieweg, 2015.

6.3 Conferences, seminars and theses:

1. ***O. Music****, F. Ozhan, A. E. Tekkaya*: Simulation of the Cold Ring Rolling Process, *3rd International Cold Forging Group Workshop on Process Simulation in Metal Forming Industry*, ICFG / 2003.

2. *Feridun Ozhan, A. Erman Tekkaya, Turhan Savas, Murat Arbak,* ***Omer Music****, Volkan Guley:* Finite Element Simulation of Metal Forming Processes at ORS Bearings, *Proceedings of the MSC.Software Users Conference,* Istanbul 2004.

3. ***O. Music****, V. Guley, M. Oztop, F. Ozhan, T. Savas, A. E. Tekkaya:* Analysis of Cold Ring Rolling Process, *Proceedings of the 8th International Conference on Technology of Plasticity*, Verona/Italy 2005.

4. ***O. Music****:* Analysis of Cold Ring Rolling Process, *Master of Science Thesis*, Middle East Technical University/Ankara, 2005.

5. ***O. Music***: Suggestions on educational aspects of metal forming and Finite Element modelling, *Virtual Intelligent Forging 6th Framework project - Workshop on educational aspects of virtual metal forming, Ankara 2006.*

6. ***O. Music****, J.M. Allwood:* A method for evaluation of flexible forming processes, *Proceedings of the 9th International Conference on Technology of Plasticity*, Gyeongju/Korea 2008.

7. ***O. Music****, J.M. Allwood:* Work on innovative flexible forming processes, *5th JSTP International Seminar on Precision Forging*, Kyoto 2009.
   (Invited young researcher).

8. ***O. Music****, J.M. Allwood:* New and future metal forming technologies, *Advances in Metals Manufacturing Technologies - Sheffield Metallurgical and Engineering Association Conference*, Sheffield 2010.
   (Invited speaker).

9. **O. Music**: Flexible Asymmetric Spinning, *Doctor of Philosophy Thesis*, Department of Engineering, University of Cambridge, 2011.

10. B. Baranoğlu, **O. Music**, M.E. Tamer, A. Sakin, İ. Durgun: Industry Funded Undergraduate Research Projects as a New Method for Industry-University Cooperation: The Example of TOFAS-Atilim University Joint Project on Incremental Forming, International Engineering Education Conference, Antalya / Turkey, 2012.

11. B. Baranoğlu, **O. Music**, M.E. Tamer, A. Sakin, İ. Durgun: Use of Incremental Sheet Metal Forming in Prototype Manufacturing: Simulation, Manufacturing and Validation, Production Research Symposium, İzmir / Turkey, 2012.

12. B. Baranoğlu, **O. Music**, M.E. Tamer, A. Sakin, İ. Durgun: Numerical modelling of Incremental Sheet Forming for industrial prototype manufacturing, 6th Automotive Technologies Congress, Bursa / Turkey 2012.

13. M. E. Tamer, **O. Music**, I. Ozdemir, B. Baranoglu, A. Sakin, İ. Durgun: Simulation for Incremental Sheet Forming: a comparison of implicit and explicit Finite Element Analysis with experimental data, 7th International conference on design and production of machines and dies/molds, Antalya, Turkey, 2013.

14. M. E. Tamer, K. Davut, **O. Music**: Investigation of plastic strains in Incremental Sheet Forming using hardness tests, Proceedings of the 2nd International Conference on Metal Forming, Ankara, Turkey, 2014.

15. M. E. Tamer, K. Davut, **O. Music**, I. Durgun: Using Magnetic Barkhausen Noise Technique for the Prediction of Properties of Components Manufactured by Incremental Sheet Forming, 11th International Conference on Barkhausen Noise and Micromagnetic Testing, Kusadasi, Turkey 2015.

6.4 Technical reports:

These reports were produced for local and international industry.

1. Modelling and analysis of the Incremental Sheet Forming process, 2012.
2. Mechanical characterisation of a high-alloy steel by upsetting tests, 2013.
3. Residual stress measurement and analyses, 2013.
4. Determination of surface bonding strength in fuel injector components, 2013.
5. High-alloy steel microstructural analyses, 2013.
6. Determination of mechanical properties for steels used in fuel injector systems, 2013.

7. Determination of mechanical properties of a steel used in fasteners, 2013.
8. Numerical simulation of adhesive wear in fastener production, 2014.
9. A Matlab-based tool for optimisation of forming dies in fastener production, 2014.
10. Numerical simulation and analysis of cartridge filters used in fuel injector systems, 2014.
11. Numerical analysis of the shear spinning process, 2015.
12. Analysis of forging processes used in automotive industry, 2015.
13. Numerical modelling of the autofrettage process, 2016.

7. Other professional activities

7.1 Graduate theses supervised and co-supervised:

1. Analysis of elastic-plastic interference fit joints, MSc
   Hava Huyuk Isik, Atilim University, Turkey. (completed)

2. Mechanical characterisation of aerospace alloys for stamping at room temperature
   Rasim Koksal Ertan, Atilim University, Turkey. (co-supervisor, completed)

3. Process simulation for room temperature forming of superalloy sheets, MSc
   Yunus Durmazkeser, Atilim University, Turkey. (co-supervisor, completed)

4. Modelling of Incremental Sheet Forming, MSc
   Pelin Memicoglu, Atilim University, Turkey. (supervisor, continuing, expected graduation: October 2016)

5. Modelling and analysis of tube spinning, MSc
   Kerem Cizmeci, Atilim University, Turkey. (supervisor, continuing, expected graduation: January 2017)

6. Process simulation for room temperature forming of aerospace alloy sheets, MSc
   Dilek Akay, Atilim University, Turkey. (co-supervisor, continuing, expected graduation: January 2017)

7. Modelling and analysis of hot ring rolling for production of bearing rings, MSc
   Bekir Avci, Atilim University, Turkey. (supervisor, continuing)

8. Structural analysis of high-performance fuel injector valves, MSc
   Mert Mutlu, Atilim University, Turkey. (supervisor, continuing)

7.2 Projects:

Project coordinator/researcher on a total of 18 academic and industrial projects and scientific consultant on 7 industrial projects. Coordinator of a large-scale EU-H2020 project under preparation.

Project details are not given here due to confidentiality agreements; however, information is available upon request.

7.3 Conference and workshop organisation:

1. Co-host and editor: 47th Plenary Meeting, International Cold Forging Group, Turkey, 2014.
2. Co-host and editor: 2nd International Metal Forming Conference, Turkey, 2014.
3. Organiser and host: Forging applications using Transvalor Forge, 2014.

4. Organiser and host: Spinning and flow-forming applications for automotive and defence industry, 2016.
5. Organiser, co-host and editor: 36th International Deep Drawing Research Group Conference, Turkey, 2017.

7.4 Lectured courses:

1. MFGE 303 – Theory of manufacturing technology I (Metal Forming)
   3rd year Undergraduate course, 2012-present.

2. MFGE 543 – Theory of sheet metal forming
   Graduate course, Atilim University, 2012-present.

3. MFGE 549 – Experimental stress analysis
   Graduate course, Atilim University, 2015-present.

7.5 Training for researchers in industry:

1. Linear and non-linear Finite Element Analysis using Simulia Abaqus, 2013.
2. Introduction to metal forming and analysis using Simufact (MSC.Marc), 2015.
3. Theory of plasticity and sheet metal forming, 2015.
4. Linear and non-linear Finite Element Analysis using Simulia Abaqus, 2015.