

Bekir Bediz

CONTACT INFORMATION

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ACADEMIC

Sabanci University (SU), Istanbul, Turkey

Assistant Professor, Mechatronics Engineering Program, August 2016 — Present

Carnegie Mellon University (CMU), Pittsburgh, PA, USA

Post-doctoral Research Associate, Mechanical Engineering, February 2015 — July 2015

Ph.D., Mechanical Engineering, December 2014

Dissertation: Three dimensional dynamics of micro tools and miniature ultra-high-speed spindles

Advisor: Prof. O. Burak Ozdoganlar

Expertise: Structural dynamics, rotor dynamics, vibrations, experimental modal analysis, micro-manufacturing.

GPA: 4.00/4.00

Middle East Technical University (METU), Ankara, Turkey

M.Sc., Mechanical Engineering, July 2009

Dissertation: In vivo human tibial bone strength measurement by modal vibration analysis

Advisors: Prof. H. Nevzat Ozguven, Prof. Feza Korkusuz

Expertise: Structural dynamics, vibration, experimental modal analysis

GPA: 3.86/4.00

B.S., Mechanical Engineering, June 2006

GPA: 3.86/4.00

JOURNAL PUBLICATIONS

Bediz, B., Ozdoganlar, O. B., 2018, 'Three dimensional dynamics of rotating micro-endmills and -drills including attachment (setup) errors', *Precision Engineering*, (to be submitted).

Bediz, B., 'A spectral-Tchebychev method for thick plates having arbitrary geometry under mixed boundary conditions', *Journal of Sound and Vibration*, v.432, pp. 272-289.

Bediz, B., 'Three-dimensional vibration behavior of bi-directional functionally graded curved parallelepipeds using spectral Tchebychev approach', *Composite Structures*, v.191, pp. 100-112.

Bediz, B., Aksoy, S., 2018, 'A spectral-Tchebychev solution for three-dimensional dynamics of curved beams under mixed boundary conditions', *Journal of Sound and Vibration*, v.413, pp. 26-40.

Korkmaz, E., Gozen, B. A., **Bediz, B.**, Ozdoganlar, O. B., 2017, 'Accurate measurement of micromachining forces through dynamic compensation of dynamometers', *Precision Engineering*, v.49, pp. 365-376.

Korkmaz, E., Gozen, **B. A.**, **Bediz, B.**, Ozdoganlar, O. B. 2015, 'High-Frequency Compensation of Dynamic Distortions in Micromachining Force Measurements', *Procedia Manufacturing*, v.1, pp. 534-545.

- Bediz, B.**, Romero, L. A., Ozdoganlar, O. B., 2015, 'Three dimensional dynamics of rotating structures under mixed boundary conditions', *Journal of Sound and Vibration*, v.358(8), pp. 176–191.
(doi:10.1016/j.jsv.2015.08.015)
- Bediz, B.**, Gozen, B. A., Korkmaz, E., Ozdoganlar, O. B., 2014, 'Dynamics of ultra-high-speed (UHS) spindles used for micromachining', *International Journal of Machine Tools and Manufacture*, v.87, pp. 27-38.
(doi:10.1016/j.ijmachtools.2014.07.007)
- Bediz, B.**, Korkmaz, E., Ozdoganlar, O. B., 2014, 'An impact excitation system for repeatable, high-bandwidth modal testing of miniature structures', *Journal of Sound and Vibration*, v.333, pp. 2743-2761.
(doi:10.1016/j.jsv.2014.02.022)
- Filiz, S., **Bediz, B.**, Romero, L. A., Ozdoganlar, O. B., 2014, 'Three dimensional dynamics of pretwisted beams: A spectral-Tchebychev solution', *Journal of Sound and Vibration*, v.333, pp. 2823-2839.
(doi:10.1016/j.jsv.2014.01.010)
- Korkmaz, E., **Bediz, B.**, Gozen, B. A., Ozdoganlar, O. B., 2014, 'Dynamic characterization of multi-axis dynamometers', *Precision Engineering*, v.38(1), pp. 148-161.
(doi:10.1016/j.precisioneng.2013.08.006)
- Bediz, B.**, Korkmaz, E., Khilwani, R., Donahue, C., Erdos, G., Falo Jr., L. D., Ozdoganlar, O. B., 2014, 'Dissolvable microneedle arrays for intradermal delivery of biologics: fabrication and application', *Pharmaceutical Research*, v.31(1), pp. 117-135.
(doi:10.1007/s11095-013-1137-x)
- Suphekar, S. D., Gozen, B. A., **Bediz, B.**, Ozdoganlar, O. B., Skerlos, S. J., 2013, 'Feasibility of supercritical carbon dioxide based metalworking fluids in micromilling', *Journal of Manufacturing Science and Engineering*, v.135(2), 024501.
(doi:10.1115/1.4023375)
- Filiz, S., **Bediz, B.**, Romero, L. A., Ozdoganlar, O. B., 2012, 'A spectral-Tchebychev solution for three-dimensional vibrations of parallelepipeds under mixed boundary conditions', *Journal of Applied Mechanics*, v.79(5), 051012.
(doi:10.1115/1.4006256)
- Bediz, B.**, Kumar, U., Ozdoganlar, O. B., and Schmitz, T. L., 2012, 'Modeling and experimentation of three-dimensional dynamics of endmills', *International Journal of Machine Tools and Manufacturing*, v.53(1), pp. 39-50.
(doi:10.1016/j.ijmachtools.2011.09.005)
- Bediz, B.**, Ozguven, H. N., and Korkusuz, F., 2009, 'Vibration measurements predict the mechanical properties of tibia', *Journal of Clinical Biomechanics*, v.25, pp. 365-371.
(doi:10.1016/j.clinbiomech.2010.01.002)
- Bediz, B.**, 2017, 'Vibration behavior of curved three-dimensional structures using spectral-Tchebychev approach', *International Conference on Vibration Problems*, Guwaati, India.
- Korkmaz, E., Gozen, B. A., **Bediz, B.**, Ozdoganlar, O. B., 2015, 'High-frequency compensation of dynamic distortions in micromachining force measurements', *North American Manufacturing Research Conference*.
- Bediz, B.**, Ozdoganlar, O. B., 2015, 'Modeling three-dimensional dynamics of rotating micro endmills including attachment errors', *International Conference on Micromanufacturing*.
- Hao, B., Korkmaz, E., **Bediz, B.**, Ozdoganlar, O. B., 2014, 'A novel test artifact for performance evaluation of additive manufacturing processes', *American Society for Precision Engineering Conference*.

CONFERENCE
PUBLICATIONS

- Korkmaz, E., **Bediz, B.**, Gozen, B. A., Ozdoganlar, O. B., 2014, ‘Accurate measurement of micromachining forces through high frequency correction of multi-axis dynamometers’, *Proceedings of International Conference on Micromanufacturing*.
- Korkmaz, E., **Bediz, B.**, Gozen, B. A., Ozdoganlar, O. B., 2013, ‘Force measurement characteristics of multi-axis dynamometers’, *North American Manufacturing Research Conference*.
- Korkmaz, E., **Bediz, B.**, Khilwani, R., Erdos, G., Falo Jr., L. D., Ozdoganlar, O. B., 2013, ‘A novel technique for fabrication of dissolvable microneedle arrays’, *7th International Conference on Microtechnologies in Medicine and Biology*.
- Hao, B., Korkmaz, E., **Bediz, B.**, Ozdoganlar, O. B., 2013, ‘Geometric qualification of polymer micro and meso-scale features fabricated by UV-based additive manufacturing’, *International Conference on Micromanufacturing*.
- Korkmaz, E., **Bediz, B.**, Khilwani, R., Erdos, G., Falo Jr., L. D., Ozdoganlar, O. B., 2013, ‘Fabrication of water-soluble and biodegradable microneedle arrays for drug delivery’, *Nano and Micro Manufacturing*.
- Bediz, B.**, Korkmaz, E., Ozdoganlar, O. B., 2013, ‘An impact excitation system for repeatable, high-bandwidth modal testing of miniature structures’, *IMAC-XXXI Conference & Exposition on Structural Dynamics*.
- Bediz, B.**, Korkmaz, E., Gozen, B. A., Ozdoganlar, O. B., 2012, ‘Dynamic characterization of a miniature ultra-high-speed (UHS) spindle through experimental modal analysis’, *Proceedings of the 12th International euspen conference*, June 4-8, Stockholm, Sweden.
- Korkmaz E., **Bediz, B.**, Gozen, B. A., Ozdoganlar, O. B., 2012, ‘Identification of dynamometer dynamics for accurate measurement of micro-cutting forces,’ *Proceedings of International Conference on Micromanufacturing*, Northwestern University, IL, March 12-14.
- Bediz, B.**, Khilwani, R., Kota, N., Salas, G., Ozdoganlar, O. B., 2011, ‘Mechanical micro-manufacturing and its applications’, *Manufacturing for Growth*, Napa Valley, CA.
- Bediz, B.**, Kumar, U., Ozdoganlar, O. B., Schmitz, T. L., 2011, ‘Three-dimensional endmill dynamics: Modal development and experimental validation’, in *Proc. of the ASME, 2011 International Manufacturing Science and Engineering Conference*, Corvallis, OR, June 13-17, 111-118.
- Khilwani, R., **Bediz, B.**, Long, G. A., Ozdoganlar, O. B., 2011, ‘Micromachining of polymers’, *Proceedings of International Conference on Micromanufacturing*, Japan.
- Ozdoganlar, O. B., Schmitz, T. L., **Bediz, B.**, Kumar, U., 2011, ‘Three-dimensional endmill dynamics: Modal development and experimental validation,’ in *Proc.*, 2011 NSF Engineering Research and Innovation Conference, Atlanta, GA, Jan 4-7.
- Bediz, B.**, Ozguven, H. N., Korkusuz, F., 2008, ‘Measuring structural dynamic properties of human tibia by modal testing’, *Proceedings of the 26th International Modal Analysis Conference*, Orlando, Florida, February.
- INVITED TALKS AND PRESENTATIONS **Bediz, B.**, April 2018, ‘Mechanical micro-manufacturing and its applications on biomedical systems’, Turkey-Taiwan Health Science Symposium, Ankara, Turkey.
- (Keynote) **Bediz, B.**, October 2016, ‘A novel fabrication technique for dissolvable microneedle arrays’, 8th National Biomechanics Congress, Ankara, Turkey.

- GRANT PROPOSALS ‘Kompozit yapıların ç boyutlu gerilme, burkulma ve dinamik davranışının yüksek doğruluklu ve hesaplamalı olarak verimli tahmini için yeni bir spektral modelleme yaklaşımının geliştirilmesi ve kompozit yapı tasarımı eniyilemesi’, PI: **Bediz B.**, TÜBİTAK, 3501 Career Development Program (CAREER). (accepted, 2018)
- ‘Yapıların Yüksek Doğruluklu Modal Analizi İçin Otomatik Darbe Tahrik Sistemi Geliştirilmesi’, PI: **Bediz B.**, TÜBİTAK, 3001 Starting R&D Projects Funding Program. (September 2017 - August 2019)
- ‘Karmaşık Dinamik Yapıların Spektral-Tchebychev Tekniği ile Modellenmesi ve Yapısal Özelliklerinin Hesaplanması’, PI: **Bediz B.**, TÜBİTAK, 2232 Yurda Dönüş Araştırma Burs Programı. (September 2016 - August 2018)
- TEACHING EXPERIENCE **2016 - Present: Faculty Member in Sabanci University**
- ME405** Mechanical Vibrations
CS409 Introduction to Scientific Computing
- 2016 Summer: Lecturer in TOBB University of Economics and Technology**
MAK310 Numerical Methods
- 2015 Fall: Lecturer in Middle East Technical University**
ME212 Principles of Production Engineering
- 2010 - 2011: Teaching Assistant in Carnegie Mellon University**
24452 Mechanical Systems Experimentation
- 2006 - 2009: Teaching Assistant in Middle East Technical University**
ME200 Mechanical Engineering Orientation
ME208 Dynamics
ME301 Theory of Machine I
ME302 Theory of Machine II
ME307 Machine Elements I
ME401 Internal Combustions Engines
ME403 Heating, Ventilating, Air Conditioning, and Refrigeration
ME407 Mechanical Engineering Design
ME410 Mechanical Engineering Systems Laboratory
ME426 Internal Combustions Engine Design
- REFEREE SERVICE **Journal of Manufacturing Science and Engineering**
Journal of Sound and Vibration
Journal of Intelligent Material Systems and Structures
Journal of Biomechanics
- FELLOWSHIPS & HONORS
- Outstanding Reviewer Award, Journal of Sound and Vibration (Elsevier), 2016
 - Carnegie Mellon University, Graduate Student Organization Conference Funding, 2013
 - John and Claire Bertucci Fellowship, Carnegie Mellon University, 2012
 - Doctorate Research Fellowship, Carnegie Mellon University, 2009–2015
 - Middle East Technical University, Graduate Courses Performance Award, 2007
 - 1st rank in Izocam Insulation (HVAC) competition, 2006
 - Graduate Fellowship of Scientific and Technical Research Council of Turkey (TUBITAK), 2006
 - Graduation with the 5th rank in the department (out of 293 students), 2006
 - Deans High Honor Certificates, 2002-2006
- HARDWARE & SOFTWARE SKILLS
- **Programming Languages:** MATLAB, MathCad, Labview, C#, Python
 - **CAD Software:** Solidworks
 - **Finite Element Analysis Packages:** ANSYS, COMSOL
 - **Productivity Applications:** T_EX(L^AT_EX, B_BT_EX), MS Office (Word, Excel, Powerpoint), Adobe Illustrator, Adobe Photoshop

- **Measurement systems & Instrumentation:** Laser Doppler Vibrometry (LDV), Scanning Electron Microscopy, National Instruments PXI devices, Impact hammer testing equipment