

STELIAN CAZAN, PhD

GEAR CONTACT ANALYSIS • DRIVETRAIN ENGINEERING • TECHNICAL CONSULTING

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COMMERCIAL PROFILE

Mechanical engineer and university Senior Lecturer (Șef lucrări) specializing in spur and helical gear contact mechanics, load distribution, and the effects of real operating and assembly conditions. Developer of a proprietary computational approach for gear-tooth contact analysis. Combines peer-reviewed research with engineering-oriented investigation of contact pressure, subsurface stress, and microgeometry effects.

HOW I CAN SUPPORT YOUR ENGINEERING TEAM

- Failure investigation and reverse engineering: assess damaged gears and reconstruct relevant tooth geometry and plausible failure scenarios.
- Fast gear-contact simulations: evaluate load distribution, edge loading, misalignment, shaft deflection and potential causes of damage.
- Contact-pressure and subsurface stress analysis: generate 3D pressure maps and assess stress concentrations under defined operating conditions.
- Gear microgeometry optimization: investigate tooth-profile modifications, end relief and crowning to reduce peak contact stresses.
- Independent engineering support: provide technical interpretation, comparative assessments and actionable recommendations to OEM, service and R&D teams.

SPEED ADVANTAGE — For representative contact-analysis cases tested with my proprietary solver, graphical results are generated in approximately 4–8 seconds per run. The solver is purpose-built for gear contact, using efficient numerical methods and rapid convergence. Comparable detailed FEA workflows may require substantially longer, depending on model complexity, setup and hardware. This speed enables rapid scenario screening and design iterations.

TECHNICAL CAPABILITIES

Spur & helical gears • 3D contact-pressure mapping • Load distribution along tooth contact • Subsurface stress • Misalignment and shaft deflection • End relief and lead crowning • Numerical algorithms • MATLAB / C / C++ • CATIA

TYPICAL PROJECT OUTPUTS

- Problem definition, assumptions and operating scenarios agreed with the client.
- Numerical contact-pressure maps and comparative results for selected configurations.
- Engineering interpretation of stress concentrations, loading patterns and potential design changes.
- Concise technical report with findings, limitations and recommended next engineering steps.

SELECTED TECHNICAL EXPERIENCE

S&S GEARCORE — Independent gear-contact analysis and engineering consulting. Focus on simulation-driven assessments for industrial gear and gearbox applications.

Gheorghe Asachi Technical University of Iași — Senior Lecturer (2025–present); Teaching Assistant (2022–2025). Teaching Strength of Materials and Lifting and Conveying Equipment.

Doctoral research (2016–2023) — Contact analysis of spur and helical cylindrical gears, including development of a dedicated computational program.

SELECTED PEER-REVIEWED PUBLICATIONS

- Cazan, S.; Dănilă, C.; Crețu, S. (2023). Tooth contact analysis of helical gears using semi-analytical methods in real gearing situations. *Tribology International*, 185, 108482.
- Cazan, S.; Bhaumik, S.; Paleu, V.; Crețu, S. (2023). Developing a fast-processing novel algorithm for contact analysis of standard spur gears. *Symmetry*, 15(2), 554.
- Cazan, S.; Crețu, S. (2024). Tooth Contact Analysis of Spur and Helical Gears in Case of Shafts Deflections. *ASME IDETC-CIE 2024*. DOI: 10.1115/DETC2024-145079.
- Cazan, S.; Crețu, S. (2018). Tooth contact analysis of spur and helical gears with end relief profiles. *IOP Conference Series: Materials Science and Engineering*, 444(2), 022004.
- Cazan, S.; Dănilă, C.; Crețu, S. (2020). Tooth contact analysis of spur and helical gears with crowned profile for pinion. *IOP Conference Series: Materials Science and Engineering*, 724(1), 012030.

Full academic CV and complete publication list available on request or through the S&S GEARCORE website.

EDUCATION

PhD in Mechanical Engineering — Gheorghe Asachi Technical University of Iași (2023). Research in gear-tooth contact analysis.

Master's Degree, Technical Diagnostics and Expert Assessment in Mechanical Engineering — Gheorghe Asachi Technical University of Iași (2022–2024).

Master's Degree, Advanced Mechatronics — Gheorghe Asachi Technical University of Iași (2014–2016).

Bachelor's Degree, Mechanical Engineering — Gheorghe Asachi Technical University of Iași (2010–2014).

WORKING ARRANGEMENT

Independent, project-based technical consulting; scope, inputs, deliverables and confidentiality to be agreed before engagement. Available for remote technical collaboration with industrial clients in Europe and internationally.

CONTACT

Discuss a gear-contact issue, a gearbox case, or a microgeometry study: contact@ssgearcore.com