

# CURRICULUM VITAE

## PERSONAL DATA

- First Name: **CĂTĂLIN BOGDAN**
- Last Name: **GALEȘ**
- Date and place of birth: July 29, 1976/ Gura Humorului (Romania)
- Work address: Al. I. Cuza University of Iași, Faculty of Mathematics, Blvd Carol I, No. 11, 700506, Iași, Romania
- Phone: +40 742258476
- E-mail: [cgales@uaic.ro](mailto:cgales@uaic.ro)
- Web page: <http://www.math.uaic.ro/~cgales/>
- Nationality: Romanian

## EDUCATION

- 1990-1994: High School: Liceul Petru Rareș (Suceava);
- 1994-1998: Faculty of Mathematics, Al.I. Cuza University of Iași;
- 1998-2000: Master studies, Faculty of Mathematics, Al. I. Cuza University of Iași
- 2000-2004: Ph.D. thesis: Initial boundary value problems in continuum mechanics, Al.I. Cuza University of Iași (supervisor: Prof. Stan Chiriță).
- 2018: Habitation thesis: Mathematical modelling in Celestial and Continuum Mechanics

## RESEARCH INTERESTS

### Fundamental Astronomy

- Celestial mechanics and Astrodynamics
- Perturbation theories
- Hamiltonian and Lagrangian mechanics

### Mechanics of deformable solids

- Mixture effects
- Saint-Venant's principle
- Uniqueness of solutions
- Stability
- Vibrations

## ACADEMIC CAREER

- 1999 - 2001: Research assistant, Faculty of Mathematics, Al. I. Cuza University of Iași
- 2001 - 2004: Assistant professor, Faculty of Mathematics, Al. I. Cuza University of Iași
- 2004 - 2014: Lecturer, Faculty of Mathematics, Al. I. Cuza University of Iași
- 2014 - 2020: Associate Professor, Faculty of Mathematics, Al. I. Cuza University of Iași
- Since 2020: Full Professor, Faculty of Mathematics, Al. I. Cuza University of Iași

## AWARDS

1. **Romanian Academy Prize Spiru Haret** for the group of papers: *Modelling in continuum mechanics*, published in 2011.
2. **Researcher of the year**, prize offered by Al. I. Cuza University of Iași for the papers published in 2012.

## HIGHEST ACADEMIC RECOGNITION RECEIVED

1. Associate member of the **International Astronomical Union (IAU)**, Inter-Division A-F Commission Celestial Mechanics and Dynamical Astronomy.
2. **Keynote speaker at Stardust Final Conference**, 31st October - 4th November, 2016, **ESA ESTEC**, Netherlands: *Dynamics of resonances in the space debris problem*

- (<https://www.stardust2013.eu/Training/Conferences/KeynoteTalks/tabid/5863/Default.aspx>);
3. Committee member of the school: *Satellite Dynamics and Space Missions: Theory and Applications of Celestial Mechanics*, August 28 - September 2, 2017, San Martino al Cimino (VT), Italy, (<http://adams.dm.unipi.it/~simca/sdsm2017/>).

## PAPERS

Author of 44 scientific research papers, 36 of which are published in ISI indexed journals, and 6 book chapters.

## EDITED BOOKS

Baù G., Celletti A., Gales C., Gronchi G.F., eds., *Satellite Dynamics and Space Missions*, Springer INDAM Series n. 34 (2019).

## GRANTS

- a. Member of the international grant: H2020-MSCA-ITN-ETN Project "STARDUST-R", period 2019-2022. (<http://www.stardust-network.eu/>)
- b. Director of two national grants for young researches:
  1. CEEEX grant, code 72, no. 1510/7.04.2006, period 2006-2008.
  2. CNCSIS grant, code TE\_184, no. 86/30.07 2010, period 2010-2013.Member of 8 national grants.

## INTERNATIONAL COLLABORATION

Alessandra Celletti, Department of Mathematics, University of Rome Tor Vergata;  
Christoph Lhotka, Space Research Institute, Austrian Academy of Sciences;  
Giuseppe Pucacco, Department of Physics, University of Rome Tor Vergata;  
Christos Efthymiopoulos, Research Center for Astronomy and Applied Mathematics, Academy of Athens;  
Aaron Rosengren, Department of Aerospace and Mechanical Engineering, University of Arizona;  
Fabien Gachet, Office national d'études et de recherches aérospatiales (ONERA) - The French Aerospace Lab.

## INVITED LECTURER AT INTERNATIONAL TRAINING SCHOOLS

1. **STARDUST-R, The Opening Training School**, Glasgow (UK), December 2-7, 2019: *Global dynamics around irregularly-shaped bodies* (one-hour lecture).
2. **STARDUST-R, The Opening Training School**, Glasgow (UK), December 2-7, 2019: *Resonance effects on the long-term evolution of circumterrestrial orbits* (one-hour lecture).
3. **The JASSY Summer School (A Journey Through Hard Sciences, Economics, Social Sciences And The Tourism Industry)**, Iași (Romania), July 9-22, 2018: *Astronomy and sky map reading* (two-hours lecture).
4. **The JASSY Summer School (A Journey Through Hard Sciences, Economics, Social Sciences And The Tourism Industry)**, Iași (Romania), July 7-21, 2019: *Astronomy and sky map reading* (two-hours lecture).
5. **I-CELMECCH Training School**, Milan (Italy), February 3-7, 2020: *Space debris* (two-hours lecture).

## INVITED SPEAKER AT ACADEMIC CONFERENCES

1. **The Ninth Congress of Romanian Mathematicians**, June 28-July 3, 2019, Galati, Romania: A portrait of resonances in the space debris problem.
2. **2018AMC<sub>70</sub> Between Mathematics and Astronomy**, A workshop in honour of Andrea Milani Comparetti on the occasion of his 70th birthday, 3-5 September 2018, Pisa, Italy: *Dynamical effects of tesseral resonances in the LEO region*.
3. **Outlook in Astronomy, Astrophysics, Space and Planetary Sciences**, 17 - 19 May 2018, Cluj-Napoca, Romania: *On the dynamics of space debris*.
4. **International Conference on Applied and Pure Mathematics**, 5th edition, November 2-5, 2017, Iași, Romania: *Effects of gravitational resonances in the space debris problem*.

5. **The Seventh International Meeting on Celestial Mechanics (CELMEC VII)**, September 3-9, 2017, San Martino al Cimino (VT), Italy: *Resonance effects within LEO, MEO and GEO regions*.
6. **9th Humboldt Colloquium on Celestial Mechanics**, March 19-25, 2017, Bad Hofgastein, Austria: *Dissipative effects in the space debris problem*.
7. **Stardust Final Conference**, 31st October - 4th November, 2016, ESA ESTEC, Netherlands: *Dynamics of resonances in the space debris problem (keynote speaker)*.
8. **XIII-ème Colloque Franco Roumain de Mathématiques Appliquées**, 25-29 Août, 2016, Iași: *Resonance effects in the dynamics of space debris*.
9. **Computational perturbative methods for Hamiltonian systems - Applications in physics and astronomy**, July 11-July 13, 2016, Athens: *A study of the lunisolar secular resonances for space debris by using the Hamiltonian formalism*.
10. **The Eighth Congress of Romanian Mathematicians**, June 26-July 1, 2015, Iași: *Dynamics of space debris: resonances and long term orbital effects*.
11. **1st Stardust Global Virtual Workshop (SGVW-1) on Asteroids and Space Debris**, 6-9 May 2014, Glasgow, Scotland: *A description of the dynamics of space debris in the 1:1 and 2:1 resonances by using the Hamiltonian formalism*.
12. **The Sixth International Meeting on Celestial Mechanics (CELMEC VII)**, September 1-7, 2013, San Martino al Cimino (VT), Italy: *A cartographic study of satellite and space debris dynamics*.
13. **European Congress on Computational Methods in Applied Sciences and Engineering**, September 10-14, 2012, Vienna: *Spatial behavior in the electromagnetic theory of microstretch elasticity*.
14. **8th European Solid Mechanics Conference**, July 9-13, 2012, Graz, Austria: *On the bending of plates in the electromagnetic theory of microstretch elasticity*.
15. **6th European Congress of Mathematics**, July 2-7 2012, Krakow, Poland: *Structural stability and convergence in piezoelectricity*.
16. **2th International Conference on Material Modelling**, August 31-September 2, 2011, Paris: *Spatial behavior of harmonic vibrations in viscoelastic materials*.
17. **Seventh Congress of the Romanian Mathematicians**, June 29-July 5, 2011, Braşov: *Spatial behaviour in the linear dynamic theory of magnetoelastoelectricity*.
18. **9th International Congress on Thermal Stresses**, June 5-9, 2011, Budapest: *On the asymptotic partition of energy in micromorphic thermopiezoelectricity*, (in collaboration with I.D. Ghiba and I. Ignătescu).
19. **Workshop for Young Researches in Mathematics**, May 12-13, 2011, Constanța: *On the spatial behavior in viscoelastic cylinders*.
20. **Workshop on Partial Differential Equations**, November 25-26, 2010, Bucharest: *On the phase space of the restricted three body problem. Application to the Sun-Jupiter-Asteroid system*.
21. **10ème Colloque Franco Roumain de Mathématiques Appliquées**, 26-31 Août 2010, Poitiers (France): *Spatial behavior in viscoelastic materials*.
22. **3rd Conference on Nonlinear Science and Complexity**, July 28-31, 2010, Ankara (Turkey): *A cartographic study of the phase space of the restricted three body problem*.
23. **The Fifth International Meeting on Celestial Mechanics**, September 6-12, 2009, Viterbo (Italy): *On the phase space of the restricted three body problem*.
24. **The Asian Conference on Mechanics of Functional Materials and Structures**, October 31-November 3, 2008, Matsue (Japan): *On spatial behaviour in viscoelastic mixtures*.
25. **The International Congress of Theoretical and Applied Mechanics (ICTAM2008)**, August 24-29 2008, Adelaide (Australia).
26. **9 ème Colloque Franco Roumain de Mathématiques Appliquées**, Braşov, Roumanie, 28 Août - 2 Septembre 2008: *A mixture theory for micropolar thermoelastic solids*.
27. **The Mechanics Conference to celebrate the 100th Anniversary of the Department of Engineering Science and Mechanics**, May 29 & 30, 2008, Blacksburg, Virginia, USA: *A mixture theory for microstretch thermoviscoelastic solids*.
28. **The meeting Theory and Applications of Dynamical Systems**, Spoleto (Italy), June 24-28, 2007: *On the Dynamics of Asteroids*.
29. **5th SREAC's Meeting: Latest Progress in Astrophysics**, Athens, 5-6 October, 2007: *Investigation of asteroid dynamics via numerical methods* (in collaboration with C. Chiruță).
30. **The international conference New Trends in Continuum Mechanics**, Constanța, September 2003: *On the spatial behavior in the theory of swelling porous elastic soils*.
31. **The XXIII National Conference of Solid Mechanics**, Ploiești, Romania, May 1999: *The Saint-Venant's problem in micropolar elasticity*.

## POPULARIZATION OF SCIENCE

- A) Over 500 planetarium lessons for students and pupils interested in astronomical phenomena;
- B) Articles published in the local newspaper *Evenimentul de Iași*:
  1. *Total Lunar Eclipse: May 3-4, 2004* (May 3, 2004, in collaboration with S. Chiriță);
  2. *Transit of Venus*, (June 5, 2004, in collaboration with Chiriță);
  3. *Total Lunar Eclipse: October 28, 2004* (October 27, 2004);
  4. *The astronomical winter starts today* (December 21, 2004);
  5. *Vernal equinox* (March 19, 2005);
  6. *Autumnal equinox* (September 22, 2005);
  7. *Annular Solar eclipse: October 3, 2005* (September 30, 2005).
- C) Interviews given to the local press for promoting various astronomical events.

## TEACHING ACTIVITIES

### Courses:

1. Astronomy (Faculty of Mathematics, Al. I. Cuza University of Iași);
2. Mathematical methods in space sciences, (Faculty of Mathematics, Al. I. Cuza University of Iași);
3. Hamiltonian and Lagrangian mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
4. Celestial Mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
5. C sharp programming (Faculty of Mathematics, Al. I. Cuza University of Iași);
6. Rational Mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
7. Mathematics (Faculty of Geography and Geology, Al. I. Cuza University of Iași);
8. Continuum Mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași).

### Seminars:

1. Astronomy (Faculty of Mathematics, Al. I. Cuza University of Iași);
2. Hamiltonian and Lagrangian mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
3. Mathematical methods in space sciences, (Faculty of Mathematics, Al. I. Cuza University of Iași);
4. Rational Mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
5. Continuum Mechanics (Faculty of Mathematics, Al. I. Cuza University of Iași);
6. Thermoelasticity (Faculty of Mathematics, Al. I. Cuza University of Iași);
7. Generalized models of continua (Faculty of Mathematics, Al. I. Cuza University of Iași);
8. Probabilities (Faculty of Mathematics, Al. I. Cuza University of Iași);
9. Mathematics (Faculty of Chemistry and Faculty of Geography and Geology, Al. I. Cuza University of Iași);
10. JAVA programming (Faculty of Mathematics, Al. I. Cuza University of Iași).

August, 2024

Cătălin Galeș

## CĂTĂLIN GALEȘ - SCIENTIFIC PUBLICATIONS

### A. Papers

2. A. Celletti, C. Gales, C. Lhotka, Resonances in the Earth's space environment, **Communications in Nonlinear Science and Numerical Simulation**, vol. 84, (2020) Article no. 105185.
3. C Lhotka, C Galeș, Charged dust close to outer mean-motion resonances in the heliosphere **Celestial Mechanics and Dynamical Astronomy**, vol. 131 (2019), Article no. 49.
4. A. Celletti and C. Galeș, Dynamics of resonances and equilibria of Low Earth Objects, **SIAM Journal on Applied Dynamical Systems**, **17** (2018), 203-235.
5. A. Celletti, C. Galeș, G. Pucacco and A. Rosengren, Analytical development of the lunisolar disturbing function and the critical inclination secular resonance, **Celestial Mechanics and Dynamical Astronomy**, **127** (2017), 259-283.
6. A. Celletti, C. Efthymiopoulos, F. Gachet, C. Galeș and G. Pucacco, Dynamical models and the onset of chaos in space debris, **International Journal of Non-Linear Mechanics**, **90** (2017), 147-163.
7. C. Lhotka, A. Celletti and C. Galeș, Poynting-Robertson drag and solar wind in the space debris problem, **Monthly Notices of the Royal Astronomical Society**, **460** (2016), 802-815.
8. A. Celletti, C. Galeș, A study of the lunisolar secular resonance  $2d\omega/dt+d\Omega/dt=0$ , **Frontier in Astronomy and Space Sciences - Fundamental Astronomy**, 31 March 2016 | <http://dx.doi.org/10.3389/fspas.2016.00011> (on-line paper)
9. A. Celletti, C. Galeș and G. Pucacco, Bifurcation of lunisolar secular resonances for space debris orbits, **SIAM Journal on Applied Dynamical Systems**, **15** (2016), 1352-1383.
10. A. Celletti and C. Galeș, Dynamical investigation of minor resonances for space debris, **Celestial Mechanics and Dynamical Astronomy**, **123** (2015), 203-222.
11. A. Celletti and C. Galeș, A study of the main resonances outside the geostationary ring, **Advances in Space Research**, **56** (2015), 388-405.
12. A. Celletti and C. Galeș, On the dynamics of space debris: 1:1 and 2:1 resonances, **Journal of Nonlinear Science** **24** (2014), 1231-1262.
13. C. Galeș and N. Baroiu, On the bending of plates in the electromagnetic theory of microstretch elasticity, **ZAMM**, **94** (2014), 55-71.
14. I.D. Ghiba and C. Galeș, Some qualitative results in the linear theory of micropolar solid-solid mixtures, **Journal of Thermal Stresses**, **36** (2013), 426-445.
15. C. Galeș, A cartographic study of the phase space of the restricted three body problem. Application to the Sun-Jupiter-Asteroid system, **Communications in Nonlinear Science and Numerical Simulation**, **17** (2012), 4721-4730.
16. I.D. Ghiba and C. Galeș, On the fundamental solutions for micropolar fluid-fluid mixtures under steady state vibrations, **Applied Mathematics and Computation**, **219** (2012), 2749-2759.
17. C. Galeș, Structural stability and convergence in piezoelectricity, **SIAM Journal on Applied Mathematics**, **72** (2012), 1856-1868.
18. C. Galeș, Some results in micromorphic piezoelectricity, **European Journal of Mechanics-A/Solids**, **31** (2012), 37-46.
19. C. Galeș, Spatial behavior and continuous dependence results in the linear dynamic theory of magnetoelastoelectricity, **Journal of Elasticity**, **108** (2012), 208-223.
20. C. Galeș, Spatial behavior in the electromagnetic theory of microstretch elasticity, **International Journal of Solids and Structures**, **48** (2011), 2755-2763.
21. C. Galeș, A spatial decay estimate in thermoviscoelastic composite cylinders, **Analele Stiintifice Univ. Al. I. Cuza Iasi, Matematica**, **LVII** (2011), 111-129.
22. C. Galeș, On spatial behavior of harmonic vibrations in viscoelastic Reissner-Mindlin plates, **International Journal of Solids and Structures**, **48** (2011), 243-248.
23. C. Galeș, On uniqueness and continuous dependence in nonlinear thermoviscoelasticity, **Journal of Thermal Stresses**, **34** (2011), 366-377.
24. C. Galeș, I.D. Ghiba and I. Ignătescu, Asymptotic partition of energy in micromorphic thermopiezoelectricity, **Journal of Thermal Stresses**, **34** (2011), 1241-1249.
25. I.D. Ghiba and C. Galeș, A uniqueness result for the motion of micropolar solid-fluid mixtures in unbounded domain, **Annali dell'Universita di Ferrara**, **57** (2011) 275-286.
26. C. Galeș, On the nonlinear theory of micromorphic thermoelastic solids, **Mathematical Problems in Engineering**, Volume 2010 (2010), Article ID 415304, 16 pages.

27. C. Galeş and I.D. Ghiba, On uniqueness and continuous dependence of solutions in viscoelastic mixtures, **Meccanica**, **45** (2010), 901-909.
28. C. Galeş, On spatial behavior of the harmonic vibrations in thermoviscoelastic mixtures, **Journal of Thermal Stresses**, **32** (2009), 512 – 529.
29. C. Galeş and S. Chiriță, On spatial behavior in linear viscoelasticity, **Quarterly of Applied Mathematics**, **67** (2009), 707-723.
30. S. Chiriță, C. Galeş and I. D. Ghiba, On spatial behavior of the harmonic vibrations in Kelvin-Voigt materials, **Journal of Elasticity**, **93** (2008), 81-92.
31. C. Galeş, Some results in the dynamics of viscoelastic mixtures, **Mathematics and Mechanics of Solids**, **13** (2008), 124-147.
32. C. Galeş, On the asymptotic spatial behaviour in the theory of mixtures of thermoelastic solids, **International Journal of Solids and Structures**, **45** (2008), 2117-2127.
33. S. Chiriță and C. Galeş, A mixture theory for microstretch thermoviscoelastic solids, **Journal of Thermal Stresses**, **31** (2008), 1099-1124.
34. C. Galeş and C. Chiruță, Investigation of asteroid dynamics via numerical methods, **Romanian Astronomical Journal**, **18**, Supplement (2008), 161-175.
35. C. Galeş, On the spatial behavior in the theory of viscoelastic mixtures, **Journal of Thermal Stresses**, **30** (2007), 1-24.
36. C. Galeş, A mixture theory for micropolar thermoelastic solids, **Mathematical Problems in Engineering**, Vol. 2007 (2007), Article ID 90672, 21 pages.
37. C. Galeş, On the quasi-static boundary value problems in the theory of swelling porous elastic soils, **Multidiscipline Modeling in Materials and Structures**, **2** (2006), 227-246.
38. C. Galeş, Waves and vibrations in the theory of swelling porous elastic soils, **European Journal of Mechanics A/Solids**, **23** (2004), 345-357.
39. C. Galeş, Potential method in the linear theory of swelling porous elastic soils, **European Journal of Mechanics A/Solids**, **23** (2004), 957-973.
40. C. Galeş, On the asymptotic partition of energy in the theory of swelling porous elastic soils, **Archives of Mechanics**, **55** (2003), 91-107.
41. C. Galeş, Spatial decay estimates for solutions describing harmonic vibrations in the theory of swelling porous elastic soils, **Acta Mechanica**, **161** (2003), 151-164.
42. C. Galeş, Existence and uniqueness results in the theory of swelling porous elastic soils, **Analele Științifice ale Universitatii "Al. I. Cuza" Iași**, vol. **49** (2003), 161-174.
43. C. Galeş, Some uniqueness and continuous dependence results in the theory of swelling porous elastic soils, **International Journal of Engineering Science**, **40** (2002), 1211-1231.
44. C. Galeş, On the spatial behavior in the theory of swelling porous elastic soils, **International Journal of Solids and Structures**, **39** (2002), 4151-4165.
45. C. Galeş, On Saint-Venant's problem in micropolar viscoelasticity, **Analele Științifice ale Universitatii "Al. I. Cuza" Iași**, **46** (2000), 131-148.

## B. Conference Proceedings

46. C. Galeş, On spatial behaviour in viscoelastic mixtures, **Proceedings of the Asian Conference on Mechanics of Functional Materials and Structures**, ACMFMS2008 (2008), 317-320.

## C. Preprints

47. H. Burgos-Garcia, A. Celletti, C. Gales, M. Gidea, L. Wai-Ting, Hill four-body problem with oblate tertiary: an application to the Sun-Jupiter-Hektor-Skamandrios system, Preprint 2018 (preprint on arXiv)

## D. PhD Thesis

*Initial boundary value problems in continuum mechanics.* Supervisor: Stan Chiriță. Examiners: Sanda Cleja-Țigoiu (University of Bucharest), Dorin Ieșan (Al.I. Cuza University of Iași), Valeriu Sava (Gh. Asachi Technical University of Iași). Thesis defense: December 19, 2003, at Al.I. Cuza University of Iași.

## **E. Habilitation Thesis**

Mathematical modelling in Celestial and Continuum Mechanics (2018)

## **F. Book chapters and articles published in encyclopedias**

1. C. Galeş, A cartographic study of the phase space of the elliptic restricted three body problem: Application to the Sun-Jupiter-Asteroid system, pp. 83-96, in **Nonlinear and Complex Dynamics. Applications in Physical, Biological and Financial Systems**, J. Machado & D. Baleanu & A. Luo (eds), Springer 2011.
2. C. Galeş, Continuous Dependence Results, vol. 2|C-D, pp. 714-721, In R. Hetnarski (ed.) **Encyclopedia of Thermal Stresses**, Springer, 2014.
3. C. Galeş, Hamilton-Kirchhoff Principle, vol. 5|H-K, pp. 2109-2114, In R. Hetnarski (ed.) **Encyclopedia of Thermal Stresses**, Springer, 2014.
4. C. Galeş, Nonlinear Thermoelastic Model, vol. 7|N-P, pp. 3377-3387, In R. Hetnarski (ed.) **Encyclopedia of Thermal Stresses**, Springer, 2014.
5. C. Galeş, Structural Stability in Linear Thermoelasticity, vol. 8|Q-S, pp. 4688-4694, In R. Hetnarski (ed.) **Encyclopedia of Thermal Stresses**, Springer, 2014.
6. C. Galeş, Uniqueness and Continuous Dependence Results in Nonlinear Thermoviscoelasticity , vol. 11|U-Z, pp. 6303-6311, In R. Hetnarski (ed.) **Encyclopedia of Thermal Stresses**, Springer, 2014.

## **G. Edited books:**

7. Baù G., Celletti A., Galeş C., Gronchi G.F., eds., **Satellite Dynamics and Space Missions**, Springer, **INDAM Series**, n. 34 (2019).