

CURRICULUM VITAE ABREVIADO (CVA)

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION

First name	Guillermo	
Family name	Rus Carlborg	
Gender	Male	Birth date: 25/12/1974
ID number		
e-mail	grus@go.ugr.es	URL: https://www.ugr.es/~grus/
Open Researcher and Contributor ID (ORCID)	0000-0002-9239-294X	

A.1. Current position

Position	Professor	
Initial date	18/12/2018	
Institution	University of Granada	
Department/Center	Structural Mechanics and Hydraulic Engineering	
Country	Spain	Telephone: +
Key words	Elastography. Ultrasonics. Biomechanics. Mechanotransduction	

A.2. Previous positions

Period	Position/Institution/Country/Interruption cause
4/1999 - 11/2001	FPU PhD Student, University of Granada
7/1999 - 9/1999	University of Linköping, Sweden - Dpt. Solid. Mech
7/2000 - 8/2000	École Polytechnique, France - Lab. Solid Mech
8/2002 - 7/2003	Fulbright postdoc, MIT, USA
9/2002 - 9/2004	Assistant professor, University of Granada
4/2003 - 5/2003	Chalmers Institute of Technology, Sweden - Dpt. Solid. Mech
7/2004 - 9/2004	University College London, UK - Control Lab
9/2004 - 12/2018	Associate professor, University of Granada
10/2008 - 2/2009	Université Paris 6, France - Laboratoire d'Imagerie Paramétrique
4/2012 - 4/2012	Technische Universität Hamburg - Airbus, Germany
11/2012 - 11/2012	NASA-Ames, USA - Prognosis center of excellence
11/2016 - 11/2016	Karolinska, Sweden - Division of functional imaging and technology

A.3. Education

PhD, Licensed, Graduate	University	Year
Ingeniero Técnico Superior de Caminos, Canales y Puertos	Univ. Granada	1998
Métodos numéricos para la detección no destructiva de defectos	Univ. Granada	2001

Part B. CV SUMMARY

Over the past ten years, the central objective of my research has focused on ultrasonic tissue mechanics, following my Fulbright postdoc at MIT (US, 2002), both in fundamentally understand the interaction between ultrasound and tissue (theory and experimentation, from propagation of linear and non-linear viscoelastic waves, to their multiscale and multiphysics histological and biochemical interactions relevant in clinical processes), as well as in its application for individualized diagnostic and therapeutic ultrasound (conception and design of new types of waves and sensors, to prototyping clinical devices).

Being a Tenured Professor of UGR since 2009, during the past ten years, I have complemented my research career with postdoc stays in different countries, including Germany (Technische Universität Hamburg - Airbus, 2012), USA (Prognosis Center of Excellence of the NASA Ames Research Center, 2012), and Sweden (Karolinska Institutet, Division of Functional Imaging & Technology, 2016). Since 2018 I am currently Professor at the UGR (Universidad de Granada, Spain), where I coordinate the Ultrasonics Lab (TEP-959) and warrant the Excellence Research Unit Modelling Nature (MNat), which integrates biology,

physics, biomedicine, engineering and mathematics to address fundamental and applied problems in the context of biomechanics, tumour dynamics, and physics of new materials. I also head the Biomechanics Group (IBS-TEC12) of the Biosanitary Research Institute.

My active role in promoting young research careers has produced 10 doctoral thesis and 6 postdocs, all currently hired in internationally renowned centers. My transfer is evident by having filed 9 patents and being the co-founder of three spin-offs: www.oritayboreas.com (5 awards, turnover 640k€/year), www.regemat3d.com (2 awards, turnover 200k€/year) and www.innitius.com (2 awards, valued 8.2M€).

- H-index: 28, 3000 total citations (Google Scholar).
- 100+ JCR (Journal Citation Reports) publications, most in Q1, as leading author, 10+ books
- 8 PhD theses finished, 6 in progress.
- 4 Plenary/perspective presentations, 20 invited international seminars.
- Editor of 3 JCR, reviewer for 7 agencies and 60+ JCR, scientific committee in 20 conferences.
- 9 patents, 2 licensed, 3 spin-offs.

Part C. RELEVANT MERITS

C.1. Publications

	Outline	Impact
B. Blanco, H. Gomez, J. Melchor, R. Palma, J. Soler, G. Rus. Mechanotransduction in tumor dynamics modeling. <i>Physics of Life Reviews</i> (44) 2023, 279-301 DOI 10.1016/j.plrev.2023.01.017	This review integrates biological mechanotransduction and mathematical modeling to understand tumor behavior and advance mechanotherapy in cancer treatment, highlighting its potential based on recent research in tumor mechanics.	11.7 D1 2 cites
Rus, G., Faris, I.H. Torres, J., Callejas, A., Melchor, J. (2020) Why Are Viscosity and Nonlinearity Bound to Make an Impact in Clinical Elastographic Diagnosis? <i>Sensors</i> 20 (8), 2379. 2020.	This whitepaper elucidates the potential of viscous and nonlinear elastic parameters as diagnostic mechanical biomarkers. First, by understanding the role of soft tissue microstructure; second, by understanding how viscosity and nonlinearity could enhance current diagnostics.	3.9 Q1 58 cites
J. Torres, G. Laloy-Borgna, G. Rus, S. Catheline; A phase transition approach to elucidate the propagation of shear waves in viscoelastic materials. <i>Appl. Phys. Lett.</i> 29 May 2023; 122 (22): 223702. DOI 10.1063/5.0150219	Dynamic elastography reveals how complex quasi-fluids exhibit liquid-solid-liquid phase transitions across frequency ranges, a phenomenon previously elusive in traditional rheometry. Jeffreys model accurately predicts these transitions.	3.791 Q1 1 cite
E. López-Ruiz, G. Rus, JA. Marchal et al. Poly (ethylmethacrylate-co-diethylaminoethyl acrylate) coating improves endothelial repopulation, biomechanical and anti-thrombogenic properties of decellularized carotid arteries for blood vessel replacement. <i>Scientific Reports (Nature Group)</i> 7(1) 2017	In this multidisciplinary work we demonstrate for the first time in animal arteries the efficacy and potential application of a new synthetic material for vascular regeneration in arteriosclerosis, where mechanical biocompatibility is one of the fundamental criteria, for which a new technique for measuring blood pressure is developed. large strain fields.	5.578 D1 20 cites
G. Rus. Nature of acoustic nonlinear radiation stress. <i>Applied Physics Letters</i> , 105(2014):12 121904	This publication lays the foundations for an interaction between fluid mechanics and acoustics misunderstood since 1948. A new term in the Navier-Stokes equation explains acoustic tweezers, cyanobacterial propulsion or medical elastography.	3.791 Q1 10 cites
L Peralta, FS Molina, J Melchor, LF Gómez, P Massó, J Florido and G Rus. Transient elastography to	For the first time, in vivo shear modulus values of the cervix are presented in 42 pregnant women of different gestational	4.645 D1 49 cites

assess the cervical ripening during pregnancy: a preliminary study. *Ultraschall in der Medizin*. (DOI 10.1055/s-0035-1553325) 2015.

M. Chiachio, J. Beck, J. Chiachio, G. Rus. Approximate Bayesian computation by subset simulation. *SIAM J Sci Comp*, 36, 3(2014):A1339-A1358

A. Fahim, R. Gallego, N. Bochud, G. Rus. Model-based damage reconstruction in composites from ultrasound transmission. *Composites Part B*. 45(2013):50-62

E. Serrano, G. Rus, J. García-Martínez. Nanotechnology for sustainable energy. *Renew. Sust. En. Rev.* 13,9(2009):2373-84

ages, corroborating the hypothesis that stiffness gradually decreases from the beginning throughout gestation.

A new approximate Bayesian computation algorithm is proposed to reconstruct model evolutionary parameters, which combines ABC principles with subset simulation for efficient simulation of extreme events.

Theoretical formulation and experimental validation of an ultrasonic transmission monitoring technique combined with the inverse problem based on computational models is presented.

Significant contributions from research groups are integrated to find solutions to one of the great challenges of our time: clean energy production and storage from nanotechnology.

3.1
D1
121
cites
13.1
1st rank
47 cites
15.9
1st rank
776
cites

C.2. Congress

3 Plenary/perspective presentations: ASA 2018, ESB 2021, ESB 2022
100+ conference presentations

C.3. Research projects

Ref + Title	Organisation	PI	Duration	Amount
PID2023-147901OB-I00 Microelastografía ... tumores	I+D (MICIU)	G. Rus	1-9-2024 - 31-3-2028	199000 €
CPP2022-009070 Neurofab - 4D biofabrication (Regemat 3D)	I+D (MICIU)	G. Rus + V. Carriel	1-11-2022 - 31-10-2025	379350 €
EP/X013650/1 Transurethral Shear Wave Elastography ...	I+D (UK)	N. Saffari	1-1-2023 - 31-12-2026	£ 1.131.721
101096884 Listen2Future Acoustic sensor solutions ...	Chips-JU (EU)	G. Rus (A.Rojko)	1-2-2023 - 31-1-2026	871000 € (30M€ Total)
INTRAIBS-2022-05.. In-vivo Viscoelastic Biomarkers, Skin...	Intramurales IBS.Granada	I. Faris	1-1-2023 - 31-12-2024	6000 €
TED2021-132438B-I00 DIGIPANCA clínico ... pancreas	Transició Dig. MINECO	J.Marchal	1-1-2023 - 31-12-2024	422050 €
PID2020-115372RB-I00 ... tumores ... ondas mecánicas	I+D (MINECO)	G. Rus	1-9-2021 - 31-8-2024	175450 € + FPI
PDC2021.120945.I00 ... cáncer de próstata mediante elastografía	I+D (MINECO)	G. Rus	1-12-2021- 31-12-23	126500 €
PYC20 RE 072 UGR Mecanoterapia	CEI - PAIDI (J. Andalucía)	G. Rus	1-1-2021- 31-12-22	151900 €
P18-RT-1653 Análisis biomecánico ... parto pretérmino	Excelencia (J. Andalucía)	G. Rus	1-1-2020 - 31-12-2022	122968€
B-TEP-026-UGR18 Análisis biomecánico ... parto pretérmino	Prog. FEDER (J. Andalucía)	G. Rus	1-1-2020 - 31-12-2021	19650€
IE2017-5537 Grupo de Ultrasonidos	PAIDI (J. Andalucía)	G. Rus	1-1-2020 - 31-12-2021	1066229€
EQC2018-004508-P Laboratorio de Evaluación No Destructiva	I+D (MINECO)	G. Rus	1-1-2019 - 31-12-2020	771306 €
DPI2017-85359-R Biomarcadores ondas de torsión	I+D (MINECO)	G. Rus	1-4-2018 - 31-9-2021	217800 € + FPI
EPSRC-IAA-2017-20 transurethral shear wave elast.	EPSRC (UK)	N. Saffari	1-9-2018 - 31-8-2021	£ 73869

PIN 0030 2017 Mecánica Tisular Ultrasónica - predicción del parto	SAS	J.Melchor	1-1-2018 - 31-12-2019	59000 €
PI 0107 2017 Mecánica Tisular Ultrasónica - predicción del parto	SAS	P. Masso	1-1-2018 - 31-12-2019	59000 €
DPI2014-51870-R Mecánica Tisular Ultrasónica: pred del parto	I+D (MINECO)	G. Rus	1-1-2015 - 31-12-2018	211750 €
INB0010 Dispositivo de diagnóstico de cáncer de próstata	FIBAO (Andalucía)	G. Rus	1-7-2017 - 31-6-2018	14000 €
PI16/00339 Predicción del Parto por elastografía ultrasónica	ISCIII (M. Sanidad)	F. Molina	1-1-2017 - 31-12-2018	96800 €
UNGR15-CE-3664 Laboratorio de Evaluación No Destructiva	I+D (MINECO)	G. Rus	1-1-2017 - 31-12-2019	894483 €
DTS15/00093 Dispositivo para predicción de parto p/ultrasonidos	ISCIII (M. Sanidad)	F. Molina	1-1-2016 - 31-12-2017	117500 €

C.4. Contracts, technological or transfer merits

Patents

2023 P202330648. Biorreactor y sistema para generación de un tejido biológico [...]
 2021 PCT/EP2021/072706. A medical apparatus for non-invasive [...] celular behaviour.
 2021 P202130760. Receptor y sensor ultrasónicos para la medición de la anisotropía [...]
 2017 P201730415. Dispositivo transluminal [...] caracterización mecánica.
 2016 P201630123. Procedimiento para obtención de datos [...] ondas de torsión.
 2015 PCT/ES2016/070540 + P201500600. Dispositivo emisor de ondas ultrasónicas [...].
 2011 PCT/ES2012/070380 + P201100700. Transductor ultrasónico [...] diagnóstico tisular.
 2011 PCT/ES2012/070132 + P201130299. Dispositivo de monitorización [...]. Licenciada.
 2011 P200802147. Estructura Autotensada para Puente de Material Compuesto.

Spin-offs

www.oritiayboreas.com	5 awards	turnover 640k€/year
www.regemat3d.com	2 awards	turnover 200k€/year
www.innitius.com	2 awards	valued 8.2M€, based on patent P201630123

Awards & prizes

2021 Premio del Consejo Social a empresas spin off: Innitius (Univ. Granada, ES).
 2017 Spanish Chapter Award (European Society of Biomechanics, ES).
 2014 Best Paper Award (Prognosis Health Management Society, FR).
 2010 2nd prize - International Engineering Design Contest (ECCE and UPM, EU).
 2007 & 2008 Juan Carlos Simó (SEMNI, mejor investigador joven en mecánica de España).
 2005 Honorary Fellow of the Wessex Institute of Technology (carrera científica, UK)
 2002 Fulbright Fellow (USA).
 2001 Premio extraordinario de tesis doctoral (Universidad de Granada).

Review and evaluation agencies and committees

Evaluator: ERC-STG, ANEP, EQA, ATIP (CNRS, FR), ANR (FR), Generalitat VA, Poland.
 Journal editor: Journal of Mathematical Problems in Engineering (JCR), Inverse Problems in Science and Engineering, Biomechanics and Mechanobiology BMCB.
 Reviewer: Plos One, Sci Reports, Cancers, IJNME, IJSS, IEEE, ASCE... 50+ JCR
 International Scientific Committees: ECCM (UK 2018), PHM (FR 2014), ESB (ES 2012), EASEC (HK 2012), ICNAAM (GR 2010), ECCM (GR 2010), METNUM (ES 2009), WCBMRM (GR 2006), EWSHM (ES 2006), CMNI (ES 2005), WCBMRM (IT 2004).

Management

Head and founder (2004) of Ultrasonics Lab, Univ. Granada [www.ugr.es/~ultrasonicslab].
 Head of the PhD & MSc program 2008-2010 [www.ugr.es/~iestructuras].
 Organizer of international conference: ESUCB 2013; ESB-CapEsp 2021.
 Head: Biomechanics Group (TEC-12), IBS + Ultrasonics Group (TEP-959), PAIDI.