

**DEPARTAMENTO DE MECANICA**  
**DE MEDIOS CONTINUOS Y**  
**TEORIA DE ESTRUCTURAS**

## **DEPARTAMENTO DE MECANICA DE MEDIOS CONTINUOS Y TEORIA DE ESTRUCTURAS**

### **Actividades de investigación**

#### **Tesis Doctorales**

- A continuum mechanics framework for hyperelastic materials: Connecting experiments and modelling  
*Autores:* GARCIA, D.  
*Director/Codirectores:* ARIAS, A.  
*Universidad:* UNIVERSIDAD CARLOS III DE MADRID  
*Centro donde se presentó:* CAMPUS DE LEGANES  
*Año:* 2016
- Análisis de la evolución del daño en laminados con agujero empleando la mecánica del daño discreto  
*Autores:* MOURE, M.M.  
*Director/Codirectores:* BARBERO, E. ; GARCIA-CASTILLO, S. K.  
*Universidad:* UNIVERSIDAD CARLOS III DE MADRID  
*Año:* 2016
- Continuum Models for the Dynamic behavior of 1D Nonlinear Structured Solids  
*Autores:* VILA, J.  
*Director/Codirectores:* FERNANDEZ-SAEZ, J. ; ZAERA, R.  
*Universidad:* UNIVERSIDAD CARLOS III DE MADRID  
*Centro donde se presentó:* CAMPUS DE LEGANES  
*Año:* 2016
- Desarrollo e implementación de modelos discretos aplicados a problemas de fractura cuasi-frágil  
*Autores:* BRAUN, M.N.  
*Director/Codirectores:* FERNANDEZ-SAEZ, J.  
*Universidad:* UNIVERSIDAD CARLOS III DE MADRID  
*Año:* 2016
- Manufacturing, Characterization and Modelling of Biodegradable Composite Materials  
*Autores:* RUBIO, A.  
*Director/Codirectores:* SANTIUSTE, C.  
*Universidad:* UNIVERSIDAD CARLOS III DE MADRID  
*Centro donde se presentó:* CAMPUS DE LEGANES  
*Año:* 2016

## **Publicaciones y actividades de difusión de resultados**

### **Publicaciones en revistas científicas internacionales**

- BRAUN, M.N.; FERNANDEZ-SAEZ, J.  
A 2D discrete model with a bilinear softening constitutive law applied to dynamic crack propagation problems, *International Journal Of Fracture Mechanics*, Vol. 197, Núm. 1, 2016, pp. 81-97, PAISES BAJOS.
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Numerical analysis of the influence of tool wear and special cutting geometry when drilling woven CFRPs, *Composite Structures*, Vol. 138, 2016, pp. 285-294, HOLANDA - PAISES BAJOS.
- FERNANDEZ-SAEZ, J. ; ZAERA, R.; LOYA, J.A.; REDDY, J.  
Bending of Euler-Bernoulli beams using Eringen's integral formulation: A paradox resolved, *International journal of engineering science*, Vol. 99, 2016, pp. 107-116, REINO UNIDO.
- MORENO, L.M.; IVANÉZ, I.; SÁNCHEZ-SÁEZ, S.  
Influence of the cohesive law shape on the composite adhesively-bonded patch repair behaviour, *Composites. Part B, Engineering*, Vol. 91, 2016, pp. 414-421, REINO UNIDO.
- MORTIMER, B.; SOLER, A.M.; SIVIOUR, C.; ZAERA, R.; VOLLRATH, F.  
Tuning the instrument: sonic properties in the spider's web, *Journal of the Royal Society interface*, Vol. 13, Núm. 122, 2016, REINO UNIDO.
- MOURE, M.M.; GARCIA-CASTILLO, S. K.; SÁNCHEZ-SÁEZ, S. ; BARBERO, E. ; BARBERO, E.J.  
Influence of ply cluster thickness and location on matrix cracking evolution in open-hole composite laminates, *Composites. Part B, Engineering*, Vol. 95, 2016, pp. 40-47, REINO UNIDO.
- PEREZ-CASTELLANOS, J. L; MONTERO, D.S.; VAZQUEZ, M.C.; ZAHR, J.A.; GONZALEZ, M.  
Photo-Thermo-Mechanical Behaviour Under Quasi-Static Tensile Conditions of a PMMA-Core Optical Fibre, *Strain*, Vol. 52, Núm. 1, 2016, pp. 3-13, REINO UNIDO.
- PERNAS, J.; ARTERO, J.A.; VARAS, D. ; LOPEZ, J.  
Experimental analysis of ice sphere impacts on unidirectional carbon/epoxy laminates. *International journal of impact engineering*, Vol. 96, 2016, pp. 1-10, REINO UNIDO.
- REDDY, J.; ROMANOV, J.; LOYA, J.A.  
Nonlinear finite element analysis of functionally graded circular plates with modified couple stress theory, *European journal of mechanics. A,Solids*, Vol. 56, 2016, pp. 92-104, FRANCIA.
- RIVAS, E.; BARBERO, E.  
Stiffness control in adaptive thin-walled laminate composite beams, *Composites. Part A, Applied science and manufacturing*, Vol. 80, 2016, pp. 118-126, REINO UNIDO.

- RODRIGUEZ-MILLAN, M.; ITO, T.; LOYA, J.A.; OLMEDO, A.; MIGUELEZ, M.H.  
Development of numerical model for ballistic resistance evaluation of combat helmet and experimental validation, *Materials and design*, Vol. 110, 2016, pp. 391-403, REINO UNIDO.
- RODRIGUEZ-MILLAN, M.; MORENO, C.E.; MARCO, M.; SANTIUSTE, C.; MIGUELEZ, M.H.  
Numerical analysis of the ballistic behaviour of Kevlar (R) composite under impact of double-nosed stepped cylindrical projectiles, *Journal of reinforced plastics and composites*, Vol. 35, Núm. 2, 2016, pp. 124-137, REINO UNIDO.
- RUBIO, L ; FERNANDEZ-SAEZ, J. ; MORASSI, A.  
Identification of two cracks with different severity in beams and rods from minimal frequency data, *Journal of Vibration and Control*, Vol. 22, Núm. 13, 2016, pp. 3102-3117, ESTADOS UNIDOS DE AMERICA.
- RUBIO, L. ; FERNANDEZ-SAEZ, J. ; MORASSI, A.  
Point mass identification in rectangular plates from minimal natural frequency data, *Mechanical System and Signal Processing*, Vol. 80, 2016, pp. 245-261, REINO UNIDO.
- RUBIO, A.; HOANG, V.T.; SANTIUSTE, C.  
Constitutive model to predict the viscoplastic behaviour of natural fibres based composites, *Composite Structures*, Vol. 155, 2016, pp. 8-18, HOLANDA - PAISES BAJOS.
- SOLER, A.M.; ZAERA, R.  
The secondary frame in spider orb webs: the detail that makes the difference, *Scientific reports*, Vol. 6, 2016, REINO UNIDO.
- SUMELKA, W.; ZAERA, R.; FERNANDEZ-SAEZ, J.  
One-dimensional dispersion phenomena in terms of fractional media, *European physical journal plus*, Vol. 131, Núm. 9, 2016.
- VADILLO, G. REBOUL, J.; FERNANDEZ-SAEZ, J.  
A modified Gurson model to account for the influence of the Lode parameter at high triaxialities, *European journal of mechanics. A, Solids*, Vol. 56, 2016, pp. 31-44, FRANCIA.
- VAZ-ROMERO, A.; RODRIGUEZ, J.A.  
On the interplay between material flaws and dynamic necking, *Mechanics research communications*, Vol. 72, 2016, pp. 53-58, ESTADOS UNIDOS DE AMERICA.
- VAZ-ROMERO, A.; ROTBAUM, Y.; RODRIGUEZ, J.A.; RITTEL, D.  
Necking evolution in dynamically stretched bars: New experimental and computational insights, *Journal of the Mechanics and Physics of Solids*, Vol. 91, 2016, pp. 216-239, REINO UNIDO.
- VILA, J.; ZAERA, R.; FERNANDEZ-SAEZ, J.  
Axisymmetric free vibration of closed thin spherical nanoshells with bending effects, *Journal of Vibration and Control*, Vol. 22, Núm. 18, 2016, pp. 3789-3806, ESTADOS UNIDOS DE AMERICA.

## Ponencias y Comunicaciones a congresos

- ARANDA, F.D.; VADILLO, G. ; RODRIGUEZ, J.A.  
*Oscillatory behaviour of compressible hyperelastic shells subjected to dynamic inflation: A numerical study*, ICTAM 2016: 24th International Congress of Theoretical and Applied Mechanics, MONTREAL, CANADA, 2016.
  
- ARANDA, J.; BRAUN, M.N.; LOYA, J.A.  
*Determinación numérica del módulo de compresibilidad en nanoestructuras de carbono mediante el BBM*; en: Anales de Mecánica de la Fractura: texto de las comunicaciones presentadas en el XXXIII Encuentro del Grupo Español de Fractura, S.E.I.E. GRUPO ESPAÑOL DE FRACTURA, 2016.
  
- ARANDA, J.; BRAUN, M.N.; RODRIGUEZ-MILLAN, M.; LOYA, J.A.  
*Computational modeling of bulk modulus in carbon nanostructures using a finite element approach*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
  
- ESCOBAR, E.; ARANDA, J.; LOYA, J.A.; SANTIUSTE, C.; MIGUELEZ, M.H.  
*Finite element modeling of UHMWPE personal protections considering strain-rate dependence*; en: ICCS19: 19th International Conference on Composite Structures, Proceedings, Società Editrice Esculapio, ITALIA, 2016.
  
- GARCIA, D.  
*A 3D numerical model for the prediction of the mechanical response of cranial implants*, Constitutive behaviour of soft tissues: connecting experimental and modelling perspectives (Workshop), MANCHESTER, REINO UNIDO, 2016.
  
- GARCIA, D.; GARZON, S.; ARIAS, A.  
*A constitutive model for thermoplastic composites under dynamic loading*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
  
- GARCIA, D.; GARZON, S.; RODRIGUEZ-MILLAN, M.; ARIAS, A.  
*Single and multiple impact behaviour of thermoplastic composites*; en: Proceedings of 2nd International Conference on Mechanics of Composites, Società Editrice Esculapio, ITALIA, 2016.
  
- IVAÑEZ, I.; BRAUN, M.N.  
*Reparaciones de fisuras superficiales con parches de material compuesto*; en: Anales de Mecánica de la Fractura: texto de las comunicaciones presentadas en el XXXIII Encuentro del Grupo Español de Fractura, S.E.I.E. GRUPO ESPAÑOL DE FRACTURA , , 2016.
  
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*Análisis numérico del efecto de la protección de mandíbula y visor en un casco de combate ante cargas explosivas*; en: Anales de Mecánica de Fractura: texto de las comunicaciones presentadas en el XXXIII Encuentro del Grupo Español de Fractura, S.E.I.E. GRUPO ESPAÑOL DE FRACTURA, 2016.
  
- MARTIN, J.; PERNAS, J.; ARTERO, J.A.; VARAS, D.; LOPEZ, J.  
*Impact performance optimization of CFRP plates using a combined experimental/FEM/Artificial Neural Networks (ANN) methodology*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.

- MATA, A.; ARTERO, J.A.; PERNAS, J.; LOPEZ, J.; VARAS, D.  
*On the study of high velocity impacts of carbon/epoxy fragments against a rigid plate: Experimental and numerical approach*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
- MATA, A.; PERNAS, J.; ARTERO, J.A.; VARAS, D. ; LOPEZ, J.  
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- MORENO, L.M.; IVAÑEZ, I.; SÁNCHEZ-SÁEZ, S.  
*Analysis of the adhesive thickness in the mechanical response of composite bonded repairs*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
- MORENO, L.M.; MOYA, E.M.; IVAÑEZ, I.; SÁNCHEZ-SÁEZ, S.  
*Influence of the traction-separation cohesive law on the failure load of adhesively-bonded repairs*, ECCM17: 17th European Conference on Composite Materials, *MUNICH*, ALEMANIA, 2016.
- MOURE, M.M.; GARCIA-CASTILLO, S. K.; SÁNCHEZ-SÁEZ, S. ; BARBERO, E. ; BARBERO, E.J.  
*Thermal Induced Damage in Laminated Composite Materials using a Discrete Damage Model*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
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*Thermo-mechanically induced damage in open-hole laminates*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Società Editrice Esculapio, ITALIA, 2016.
- MOYA, E.M.; MORENO, L.M.; IVAÑEZ, I.; GARCIA-CASTILLO, S. K.  
*Evaluation of the geometry of single-lap adhesive joints in composite laminates*, ECCM17: 17th European Conference on Composite Materials, *MUNICH*, ALEMANIA, 2016.
- REBOUL, J.; VADILLO, G.  
*Extended Gurson-type yield criteria for strain rate sensitive materials*, SolMech 2016: 40th Solid Mechanics Conference, *WARSAW*, POLONIA, 2016.
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*Compression residual strength of thin laminates with artificial delamination*, ECCM17: 17th European Conference on Composite Materials, *MUNICH*, ALEMANIA, 2016.
- RODRIGUEZ, J.A.  
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- RODRIGUEZ, J.A.; VAZ-ROMERO, A.; ROTBAUM, Y.; RITTEL, D.  
*Necking evolution in dynamically stretched bars: New experimental and computational insights*, 2016 EMI International Conference, *METZ*, FRANCIA, 2016.

- RODRIGUEZ, P.G.; ARTERO, J.A.; PERNAS, J.; VARAS, D. ; LOPEZ, J.  
*Influence of ply clustering on residual strength of 5HS woven composite laminates subjected to low velocity impacts*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Societ  Editrice Esculapio, ITALIA, 2016.
- RODRIGUEZ, P.G.; ARTERO, J.A.; PERNAS, J.; VARAS, D. ; LOPEZ, J.  
*Numerical Analysis of low velocity impacts on 5HS woven composite laminates P.*, ECCM17: 17th European Conference on Composite Materials, *MUNICH*, ALEMANIA, 2016.
- RODRIGUEZ, P.G.; PERNAS, J.; ARTERO, J.A.; VARAS, D. ; LOPEZ, J.  
*Out of plane impact on woven composite plates: effects of thickness, ply sequence and ply clustering*, ECCM17: 17th European Conference on Composite Materials, *MUNICH*, ALEMANIA, 2016.
- RODRIGUEZ-MILLAN, M.; ESCOBAR, E.; ITO, T.; SANTIUSTE, C.; LOYA, J.A.; MIGUELEZ, M.H.  
*Stab-resistance of high performance woven fabrics: Experimental tests*; en: Proceedings of ICCS19 19th International Conference on Composite Structures, Societ  Editrice Esculapio, ITALIA, 2016.
- RODRIGUEZ-MILLAN, M.; ITO, T.; LOYA, J.A.; RUBIO, I.; MARCO, M.; MIGUELEZ, M.H.  
*An lisis experimental de la resistencia a la penetraci n de cuchillo en tejidos de alto rendimiento*, XXI CNIM: XXI Congreso Nacional de Ingenier  Mecnica, *ELX/ELCHE*, ESPA A, 2016.
- RODRIGUEZ-MILLAN, M.; MARCO, M.; LOYA, J.A.; MOURE, F.; MIGUELEZ, M.H.  
*Modeling of impact dynamics and application in public security education*; en: Multidisciplinary Journal for Education, Social and Technological Sciences , Universitat Politcnica de Valencia, , 2016.
- RODRIGUEZ-MILLAN, M.; OLMEDO, A.; ROMUALDO, G.; FEITO, N.; LOYA, J.A.; MIGUELEZ, M.H.  
*Behaviour of a new combat helmet design against ballistic impact: Experimental and numerical analysis*, PASS 2016: 13th Personal Armour Systems Symposium, *AMSTERDAM*, HOLANDA - PAISES BAJOS, 2016.
- RUBIO, A.; OLMEDO, A.; DIAZ, A.; SANTIUSTE, C.  
*Parametric study on the manufacturing of biocomposite materials*; en: Natural fibres: Advances in science and technology towards industrial applications, SPRINGER SCIENCE BUSINESS MEDIA B.V., HOLANDA - PAISES BAJOS, 2016.
- VADILLO, G.  
*Collective behaviour and spacing of necks in ductile plates subjected to dynamic biaxial loading*, IUTAM 2016: IUTAM Symposium on Dynamic Instabilities in Solids, *MADRID*, ESPA A, 2016.
- VADILLO, G. ; REBOUL, J.  
*Gurson-type yield criteria for strain rate sensitive materials*, 2016 EMI International Conference, *METZ*, FRANCIA, 2016.
- VADILLO, G. ; REBOUL, J.; FERNANDEZ-SAEZ, J.  
*A modified Gurson model to account for the influence of the lode parameter at high triaxialities*, SolMech 2016: 40th Solid Mechanics Conference, *WARSAW*, POLONIA, 2016.

- VAZ-ROMERO, A.; RODRIGUEZ, J.A.  
*A one-dimensional model to describe plastic flow localization in slender bars subjected to super critical impact velocities*, 2016 EMI International Conference, *METZ*, FRANCIA, 2016.
  
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*On the interplay between material flaws and dynamic necking*, ICTAM 2016: 24th International Congress of Theoretical and Applied Mechanics, *MONTREAL*, CANADA, 2016.

## **Actividades de formación y movilidad de personal investigador**

### **Estancias en otros centros**

- ALVARO VAZ-ROMERO SANTERO; JOSE ANTONIO RODRIGUEZ MARTINEZ  
*Título: PREDOCTORAL STAY UNDER THE SUPERVISION OF PROF. DR. SÉBASTIEN MERCIER AND PROF. DR. ALAIN MOLINARI*  
*Investigador Externo: MERCIER, S., MOLINARI, A.*  
*Centro Externo: UNIVERSIDAD DE LA LORENA*  
*País: FRANCIA*  
*Duración: 05/10/2015 a 23/01/2016.*
  
- JOSE ANTONIO RODRIGUEZ MARTINEZ  
*Título: Fragmentación múltiple de sólidos deformables sometidos a altas velocidades de deformación*  
*Centro Externo: Universidad de la Lorena*  
*País: FRANCIA*  
*Duración: 01/07/2016 a 30/07/2016.*
  
- JOSE ANTONIO RODRIGUEZ MARTINEZ  
*Título: Inestabilidades plásticas en estructuras laminares metálicas sometidas a carga biaxial*  
*Centro Externo: Universidad de la Lorena*  
*País: FRANCIA*  
*Duración: 01/04/2016 a 30/04/2016.*
  
- JOSE ANTONIO RODRIGUEZ MARTINEZ  
*Título: El papel de la inercia en el desarrollo de bandas adiabáticas de cortadura*  
*Centro Externo: Technion*  
*País: ISRAEL*  
*Duración: 01/06/2016 a 30/06/2016.*
  
- MARTA MARIA MOURE CUADRADO  
*Título: Estancia predoctoral realizada en la West Virginia University en Estados Unidos, bajo la tutela del profesor Dr. Ever J. Barbero*  
*Centro Externo: West Virginia University*  
*País: ESTADOS UNIDOS DE AMERICA*  
*Duración: 01/09/2016 a 30/11/2016.*