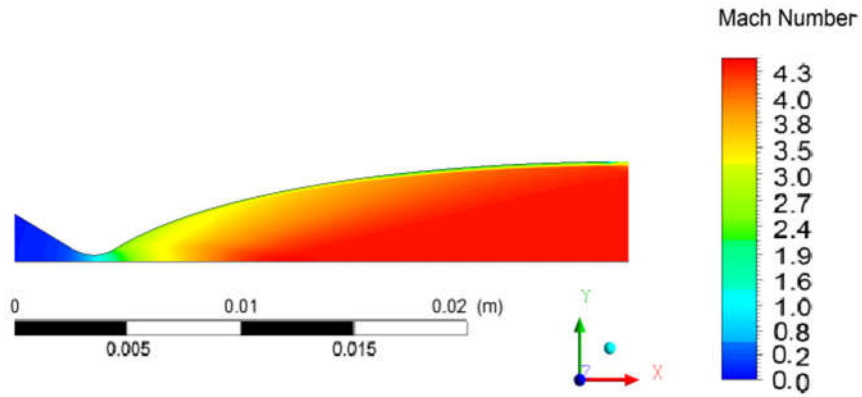
Aula CIMNE-ITBA

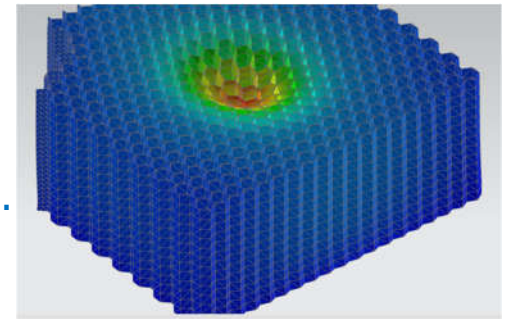
September 8th - 2017

VII Reunión de Aulas CIMNE

Our Academic Contribution



- Undergraduate Courses
  - Finite Elements
- Graduate Courses
  - Advanced Finite Elements
  - Computational Fluid Dynamics
  - Advanced Mechanical Design
  - Modelling and Simulation – Energy MSc. (KIT)
- Undergrad Final Projects (Thesis)
  - Extrusion Modelling- García Diez M.
  - Bolted joint static and dynamic modelling. Aldet M. and Lopez R.
  - Trailer optimization using microalloyed steels - Unger M.
  - Wind mill blade redesign - Cabral G. and Alderete N.
  - Active Vibration Control of a Beam with Piezoelectric Materials. Bensusan S.
  - Failure prediction of threaded inserts for sandwich panels. Di Salvo and Wilk.
  - Automated Die Design for Cold Drawing Process. Gonzalez, F.
  - Reconstitution modelling for drug delivery. L. Fraile and L. Refojo
  - Fracking Modelling via Virtual Elements. F. Kyburg and J. Mollica



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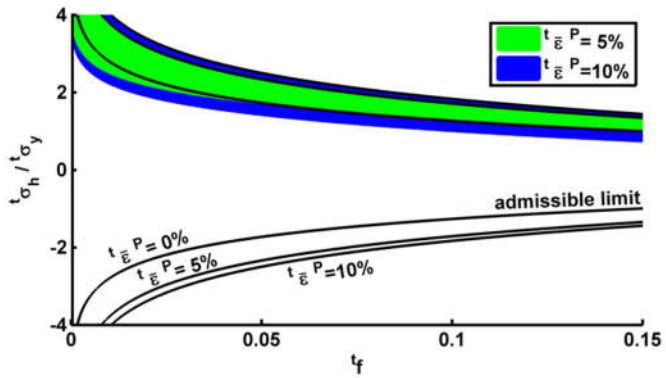
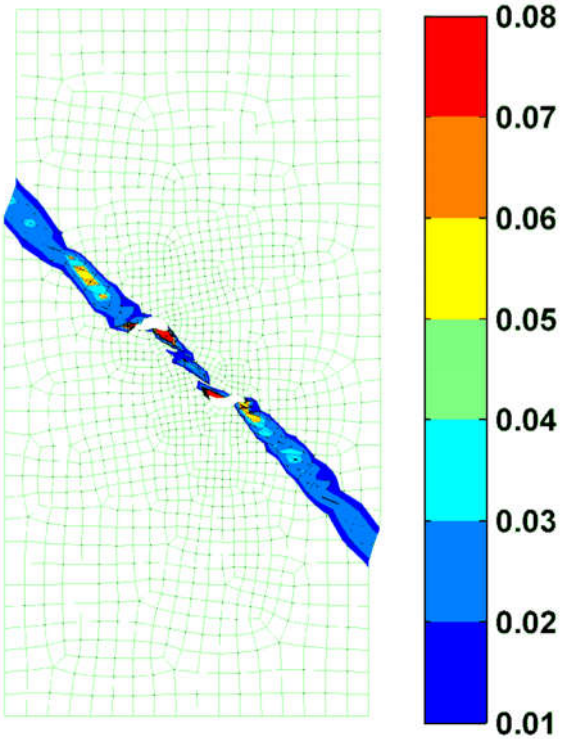
Our Projects

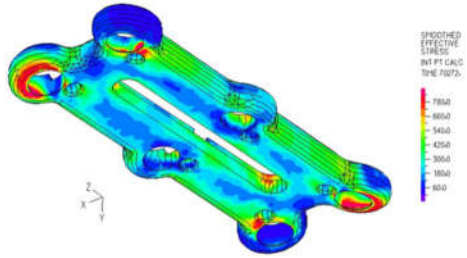
- Ductile Failure
  - Ductile Fracture
  - Strain Localization (TENARIS)

    Incompressible plasticity in porous ductile material (GTN)





- Biomechanics
  - Implant



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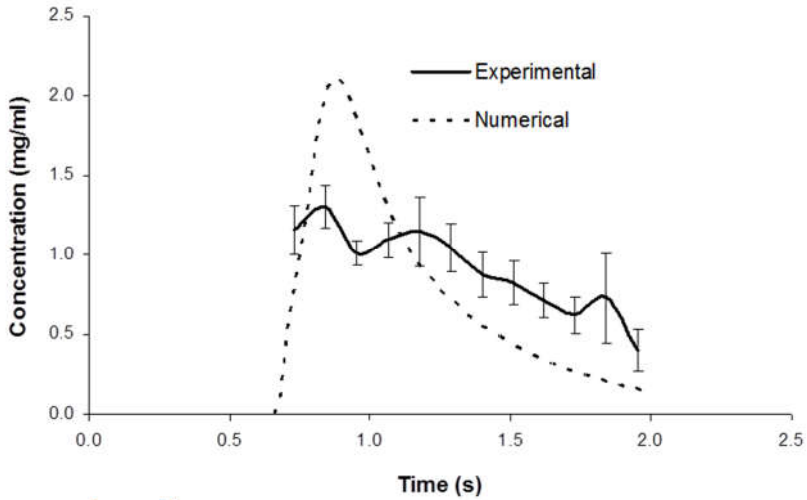
Our Projects

- Drug Reconstitution



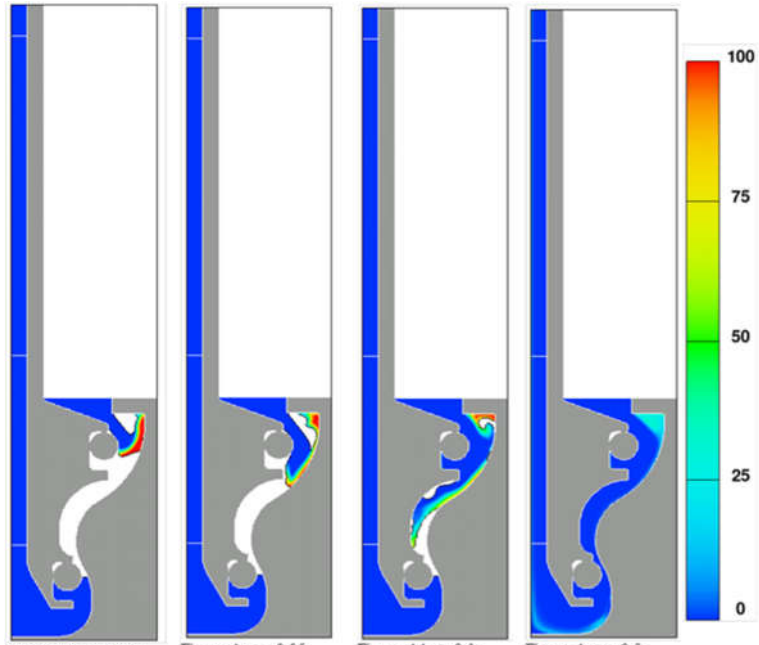
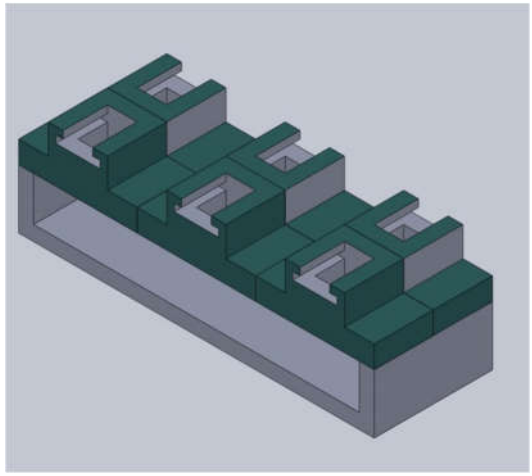
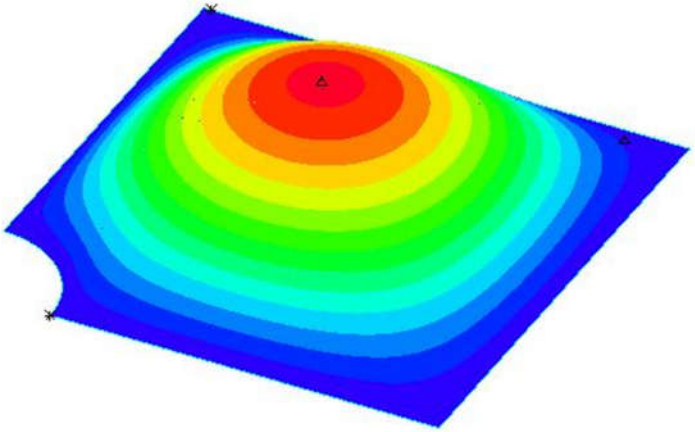
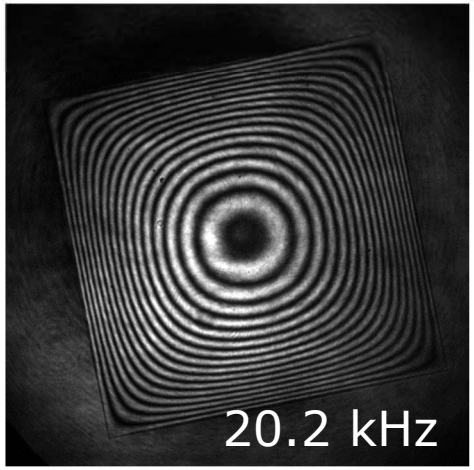


Figure 4b: *t=0.025s* Figure 4c: *t=0.05s* Figure 4d: *t=0.1s* Figure 4e: *t=0.5s*

- Micro devices







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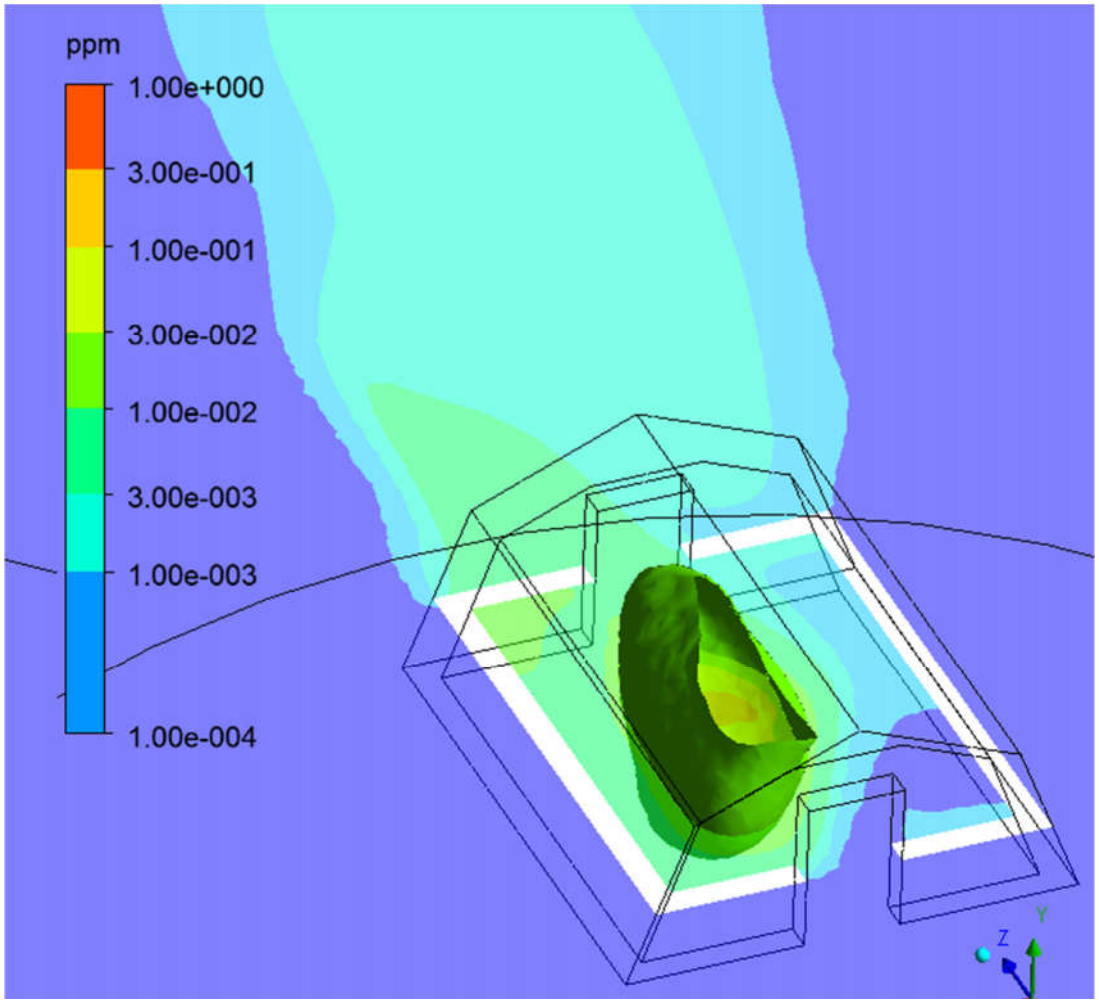
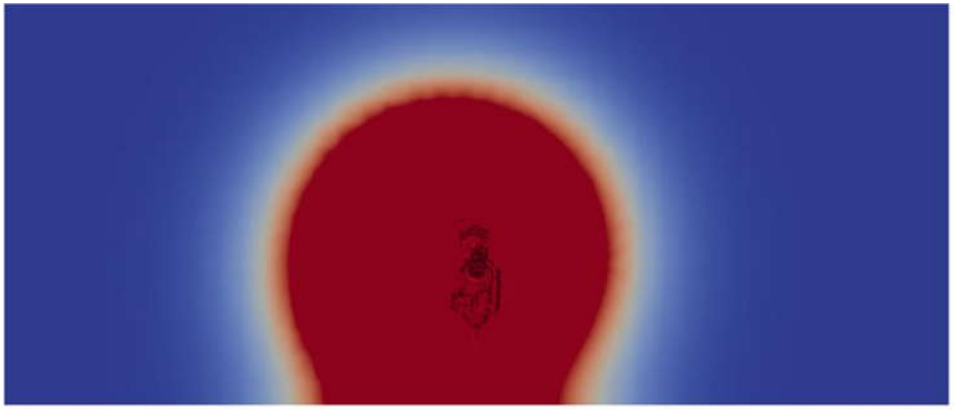
Our Projects

- Vector Born Decease Protection





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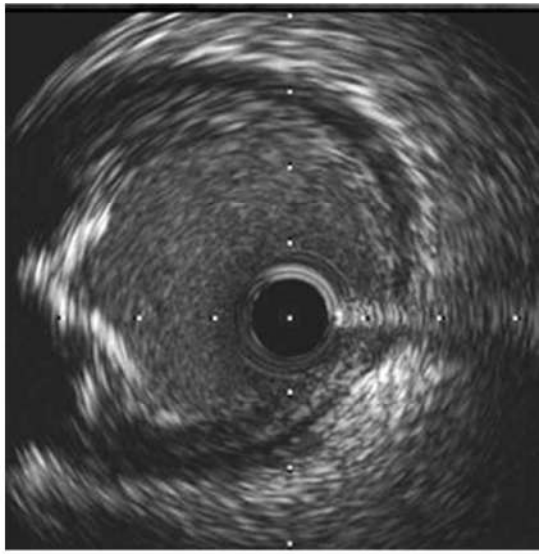
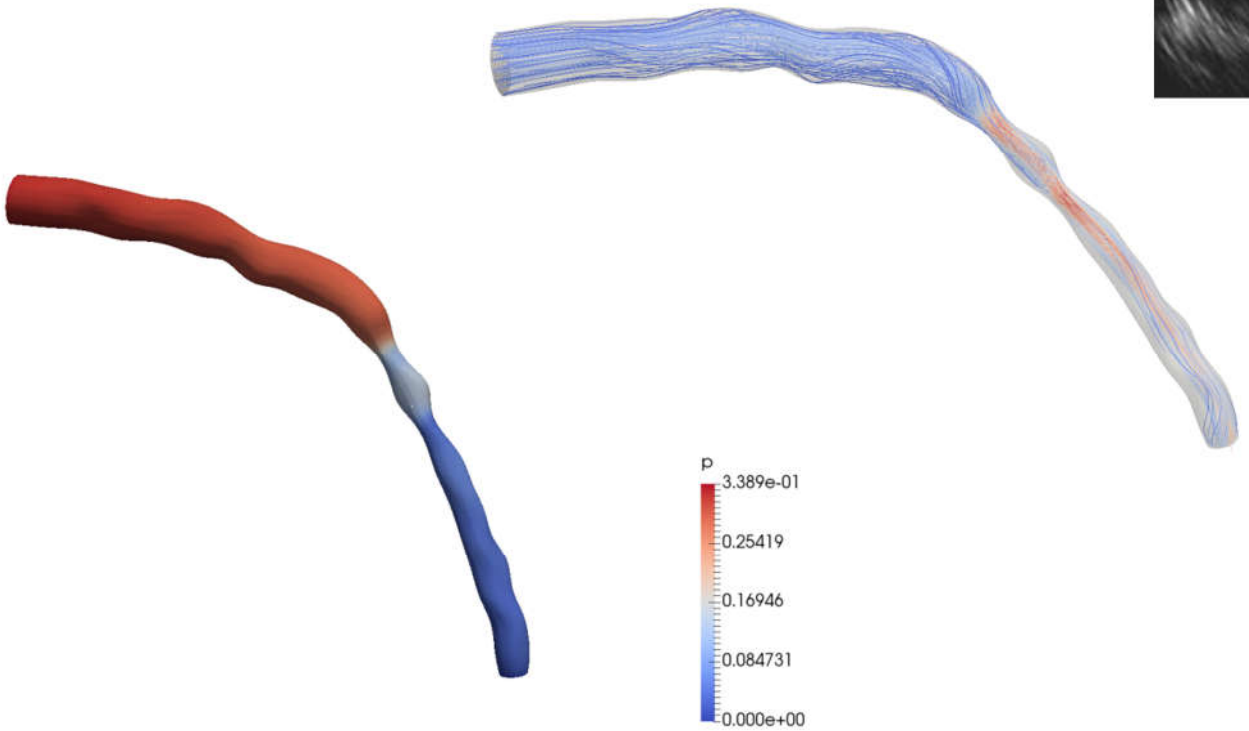
Our Projects

- Aortic Flow Diagnostics
  - Intravascular ultrasound Images (IVUS)
  - Fractional Flow Reserve (FFR)





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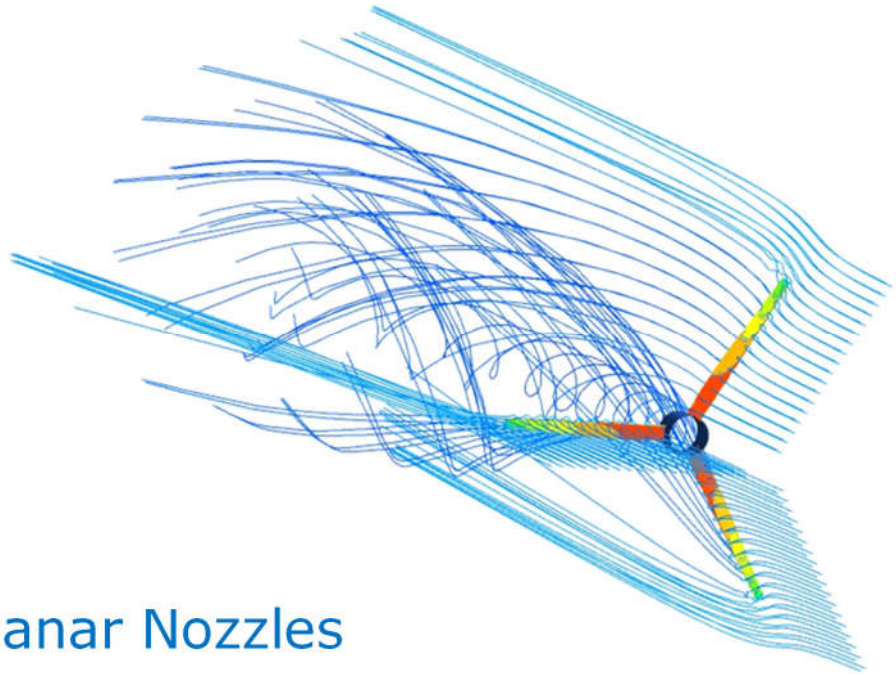
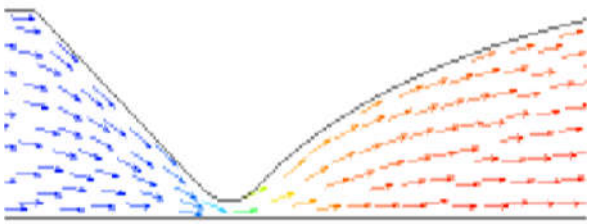
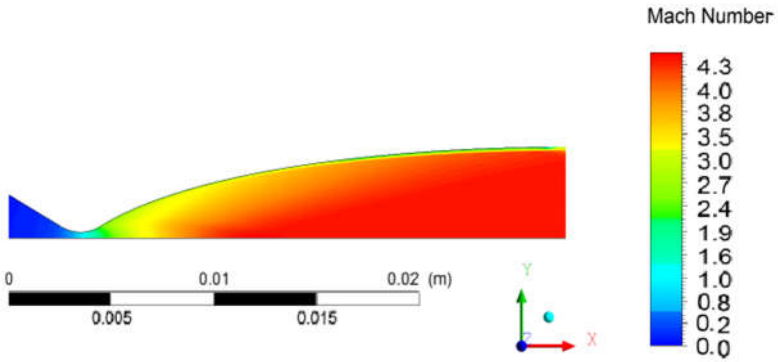
Our Projects

- Fluid Structure Interaction (KIT)



- Planar Nozzles





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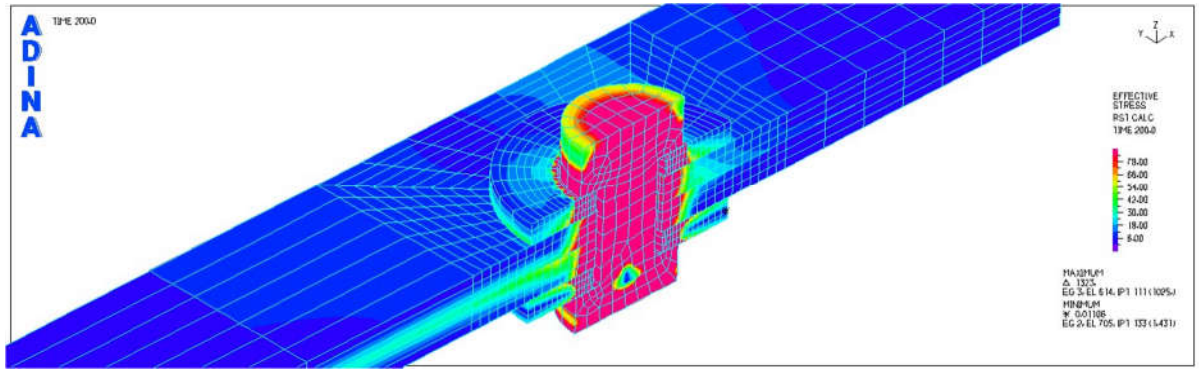
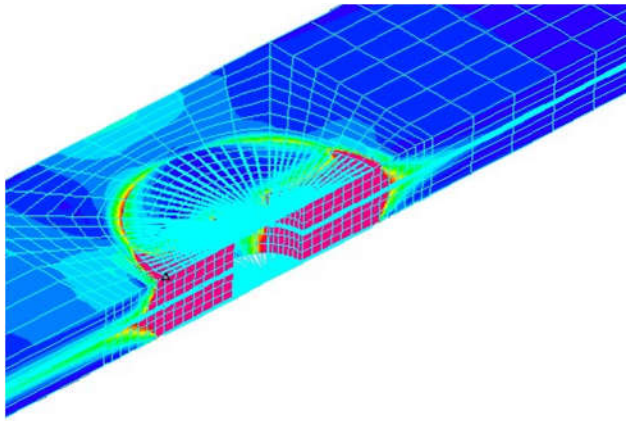
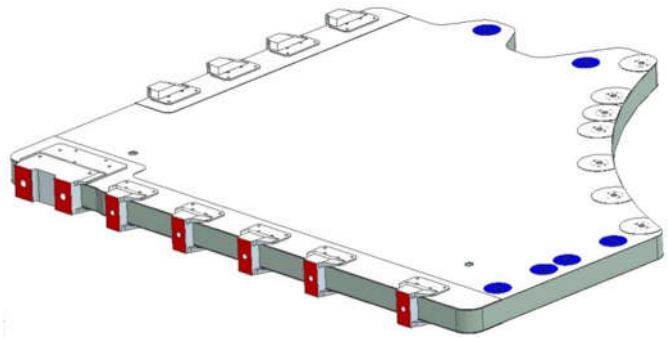
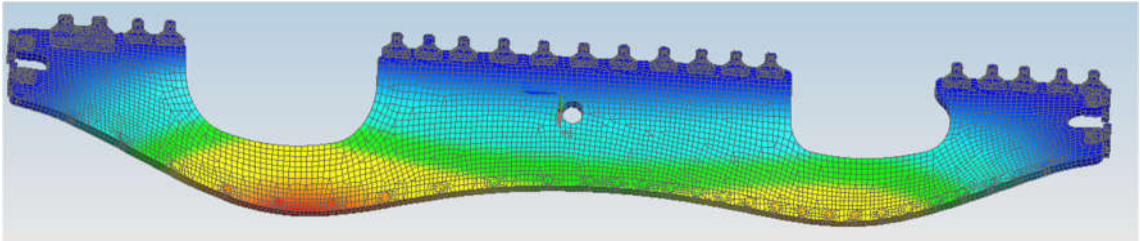
Our Projects

- Bolted Joints









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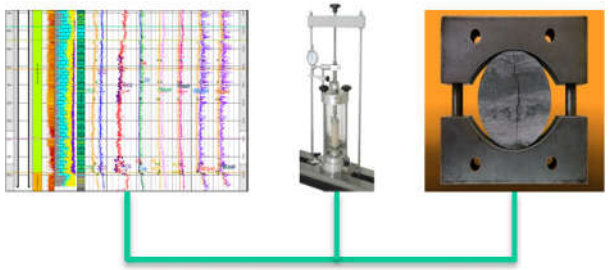
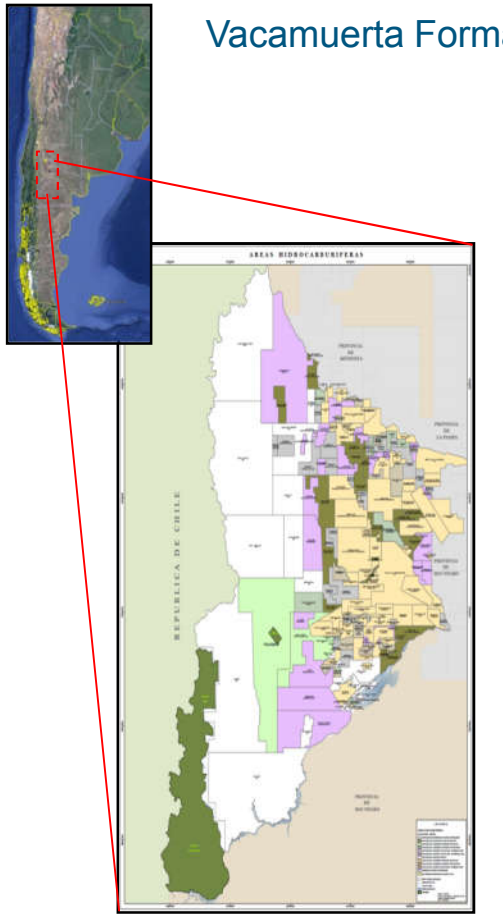
Our Projects

- Collaboration with Petroleum Eng. Department

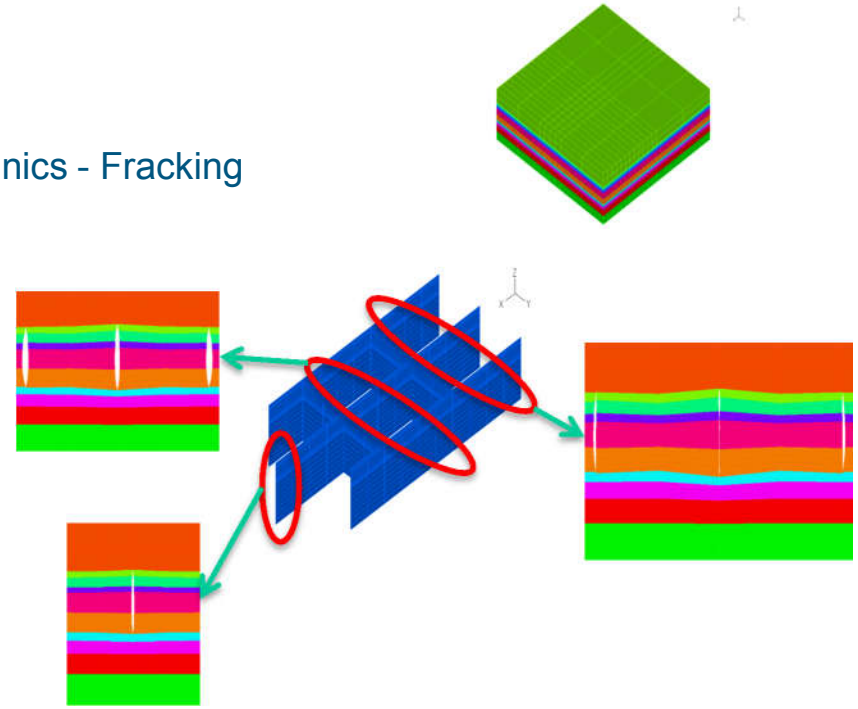
Material Properties



Vacamuerta Formation



Geomechanics - Fracking



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SPE-185563-MS “A Fluid Structure Interaction Model for Hydraulic Fracture Simulation on Vaca Muerta Argentina Shale Formation” Alderete, I.D., Sosa Massaro A., D’hers, S.

ITBA

Our Capabilities

- Crew
  - 4 Professors / Researchers
  - 1 Assistants
  - 8 Undergrad students
- Installations
  - 11 Workstations
  - 2 HPC (32c / 28c)
- Laboratory

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Publications

- Pedreira P. H., Lauretta J. R., D'hers S., "Planar Nozzles for Controllable Microthrusters", Journal of Aerospace Engineering 06016007, December 2016.
- Bright L. Z., Handley M., Chien I, Curi S., Brownworth, L. A., D'hers S., Bernier U.R., GurmanP, Elman N. M., "Analytical models integrated with satellite images for optimized pest management", Precision Agriculture, Vol. 17, No.1, February 2016.
- Gurman P., Chi A. H., Hood T. T., Reina M., Rosen Y., D'hers S., Elman N. M., "Prefilled Devices for Parenteral Applications", Expert Review of Medical Devices, Vol. 11, No. 2, Pages 205-223, 2014.
- Chi A. H., Curi S., Clayton K., Luciano D., Klauber K., Alexander-Katz A., D'hers S., and Elman N. M., "Rapid Reconstitution Packages (RRPs) implemented by integration of computational fluid dynamics (CFD) and 3D printed microfluidics", Drug Deliv. and Transl. Res., DOI 10.1007/s13346-014-0198-7, Controlled Release Society 2014.
- Chi, A.H., Clayton, K., Burrow, T.J., Lewis, R., Luciano, D., Alexis, F., D'hers, S., Elman, N.M." Intelligent drug-delivery devices based on micro-and nano-technologies", Therapeutic Delivery, Volume 4, Issue 1, Pages 77-94, 2013.
- D'hers S. and Dvorkin E. N., "Modeling shear bands in J2 plasticity using a two-scale formulation via embedded strong discontinuity modes", Int. J. Numerical Methods in Engng., Vol. 77, pp.1015-1043, 2009.
- D'hers S. and Dvorkin E. N., "On the modeling of shear bands formation in J2 materials with damage evolution", Engineering Computations, Vol. 28 Iss: 2, pp.130 – 153, 2011.

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Thank you.

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