

Entering Town  
FEA Not To Miss  
(pop. virtual)  
WELCOME

FEA Not To Miss Issue August 2023 ISSN 2694-4707

Monthly Town Hall Meeting  
Software & Engineering Blog, Gossip & News  
[www.feantm.com](http://www.feantm.com)

Abhinav



Beatrice



Jenson



Kathleen



Conference  
&  
Courses

Kensington



Global  
Events

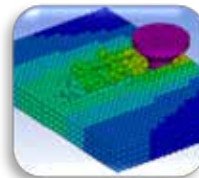
Markus



Marta



Metin



Rheannon



Poster  
Board  
YouTube

Seppi & Marta



Syn



Airport



Rancher



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Editors: (alpha order) Anthony, Art, Brianna, Marnie, Marsha, Shweta, Yanhua

Jr. Editors: Kensington, Rheannon

Town Pretend to be Editors:

**The Old Rancher** No one in town knows his name. You yell "Hey, Old Rancher."

**The Old Pilot** No one in town knows his name. You yell "Hey, Old Pilot."

**The Old Racer** No one in town knows his name. You yell "Hey, Old Racer."

**They are all brothers - strange family**

Contact us at: [feaanswer@aol.com](mailto:feaanswer@aol.com)

Attribution: [Map Vector & town graphics in our magazine are courtesy of vecteezy](#)



# Town Map

Horse Trail →



- The logos displayed above represent companies with solutions and should not be interpreted as endorsements. If you wish to have yours removed, kindly inform us at [feanswer@aol.com](mailto:feanswer@aol.com).
- Proceeds from the auction of your town lot will be allocated to the coffee budget by the Town.
- The map is subject to change based on new information, and lots will be rotated accordingly.



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**August – Page 03 is our Town Map – We welcome you to visit our town**



## Town Meeting Announcements

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# Welcome to our Town Hall Meeting and Announcements



Serving coffee & Eclairs (**you can have two!**)

Our town consists of individuals who are passionate about finding solutions, as well as caring about animals and children.

.Gossip is at the local coffee shop.

Pets are welcome. Horses, pet goats stay outside.

## **Welcome: We welcome Jr. Editors Kensington and Rheannon.**

Kensington will be posting Events. Rheannon will update the poster board.

Additionally, thank you Kensington for the wonderful emoji idea for a cover divider.

Have you all noticed that people are really into emojis?

The cover will have a different emoji divider each month.

I'm not sure why the town held an emoji vote - it was unanimous in favor of the emoji divider.

## **Notice: We need to increase the page total.**

Articles wouldn't fit our page count. We would have had to remove articles to save space.

My gavel is missing! A note advised that it was removed to save space!

You won – we authorized no max on page count. Please return my gavel!

Secretary and Pilot again have all their pages. Additionally have them return the coffee pot!

We now can expand the library, research hospital, front section.

I hope you don't mind - we really need the added space for all editors to be happy.



### **Published:**

ERS Marta Bracco and Beatrice Bisighini. Marta focused on abdominal aortic aneurysms, while Beatrice focused on intracranial aneurysms.



### **Acquitted:**

Simulation Science played a significant role in releasing 63-year-old Manfred Genditzki incarcerated for over 13 years

**He is now free**



### **Documentation:**

Oasys LS-DYNA Environment manuals are now available in an online portal.



### **Leveraged:**

CIXI leveraged the capabilities of Ansys LS-DYNA, achieving a dynamically responsive vehicle, ensuring driver safety.

**The town expresses its gratitude to the authors who have created the article and generously shared it on the Springer website, making it accessible to the engineering community at no cost.** Additionally, the town extends its appreciation to the numerous renowned and unsung developers from industry to academia, whose invaluable contributions have greatly enriched our town. We salute every one of you for your remarkable work for the community.

Thanks to B. Piak on social media for bringing the post to our attention.



Excerpt – the pdf publication with all contributor pictures is published on Springer (no fee)

**[Eighty Years of the Finite Element Method: Birth, Evolution, and Future](#)**

**Authors: Wing Kam Liu · Shaofan Li · Harold S. Park**

**We will always remember how brilliant and kind Ted was. We miss you, Ted!**



**Abstract:** This document presents comprehensive historical accounts on the developments of finite element methods (FEM) since 1941, with a specific emphasis on developments related to solid mechanics. We present a historical overview beginning with the theoretical formulations and origins of the FEM, while discussing important developments that have enabled the FEM to become the numerical method of choice for so many problems rooted in solid mechanics.

The year 2021 marks the eightieth anniversary of the invention of the finite element method (FEM), which has become the computational workhorse for engineering design analysis and scientific modeling of a wide range of physical processes, including material and structural mechanics, fluid flow and heat conduction, various biological processes for medical diagnosis and surgery planning, electromagnetics and semiconductor circuit and chip design and analysis, additive manufacturing, and in general every conceivable problem that can be described by partial differential equations (PDEs). The FEM has fundamentally revolutionized the way we do scientific modeling and engineering design, ranging from automobiles, aircraft, marine structures, bridges, highways, and high-rise buildings. Associated with the development of FEMs has been the concurrent development of an engineering science discipline called computational mechanics, or computational science and engineering.

**In this paper, we present a historical perspective on the developments of finite element methods mainly focusing on its applications and related developments in solid and structural mechanics, with limited discussions to other fields in which it has made significant impact, such as fluid mechanics, heat transfer, and fluid–structure interaction.** To have a complete storyline, we divide the development of the finite element method into four time periods: I. (1941–1965) Early years of FEM; II. (1966–1991) Golden age of FEM; III. (1992–2017) Large scale, industrial applications of FEM and development of material modeling, and IV (2018–) the state-of-the-art FEM technology for the current and future eras of FEM research. Note that this paper may not strictly follow the chronological order of FEM developments, because often time these developments were interwoven across different time periods.



**Events: Don't miss important events.**

**Don't forget to put this on your calendar app.**

It's important for you to stay up to date on the latest information.

They have exhibit areas for you to meet companies.

Also, you will meet your old friends and I hope you make new friends.



**Oct. 18 &19 Baden-Baden, Germany**

[The 14<sup>th</sup> European LS-DYNA Conference](#)



**Nov. 15-16, 2023 Detroit, Michigan**

[The latest innovations around LS-DYNA](#)



**Nov. 30, 2023, 3:00 AM - 9:00 AM (your local time)**

[Simq Conference 2023 - Digital Twin Simulation in Medicine](#)



**April 10-11, 2024 - [Call For Papers](#) – To be held at the prestigious Darmstadtium in Darmstadt, Germany.**

Additional Conferences in 2024

06/06/2024 France

06/13/2024 Switzerland Rapperswil





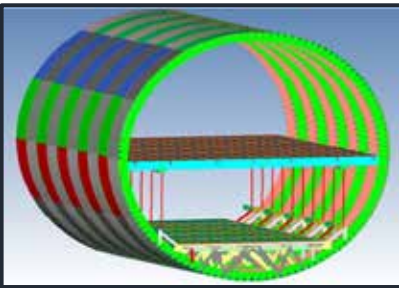
**Bulletin Board** – I know you don't want to miss information.

I found exciting posts on social-media and YouTube.

I want to make sure you didn't miss these!



**Gavin Newlands - Oasys LS-DYNA Environment - Exciting News for OasysPRIMER Users:** Oasys PRIMER positioning trees are now available for the latest THUMS v7 occupant models. These tree files allow users to achieve realistic articulation and positioning ready for simulation-based positioning using the power of LS-DYNA and are free to Oasys PRIMER users available from your local Oasys LS-DYNA distributor. [Explore the complete range of supported THUMS models and download the files](#)



**OMNIQUEST – Case Study by J.Krueger:** [Aircraft Fuselage Optimization](#) This custom-made aerospace case study demonstrates what can be done with any assembly, part, or structure of an aircraft. This is a 747 fuselage section on which sizing (thickness changes) and topology (shape changes) were used to optimize the structure for a couple of very simple load cases; cabin pressure and passenger weight...



**A blog by Thierry Marchal:** [Stacking the Deck at the Tour de France?](#) described the latest investigation from **Prof Bert Blocken and Fabio Malizia** regarding a better understanding of the complex physics of the influence of the bike(s) on the top of the roof of the following car..



**Thanks to Yury Novozhilov** - Do you ever wonder how airplanes fly? Don't miss [NASA Glenn Research Center The Beginner's Guide to Aeronautics](#)

Guide to Aerodynamics the study of forces and the resulting motion of objects through the air. Aerodynamics affects the motion of a large airliner, a model rocket, a beach ball thrown near the shore, or a kite flying high overhead. The curveball thrown by big league baseball pitchers gets its curve from aerodynamics.




Step right in and join us at our Town Hall & Coffee Café.

At our café delightful FREE cups of coffee await.

Indulge in a variety of flavors, including the classics like vanilla and hazelnut, all courtesy of our beloved coffee shop, setting aside any notions of the rival establishment.

Today we visited the booths listed below on YouTube

<p><a href="#">Rodrigo Paz</a></p>	 <p>0:40</p>	 <p>0:12</p>
<p><a href="#">CADFEM</a></p>	<p>TIPPS &amp; TRICKS: ANSYS MESHING FLUENT MESHING MOSAIC</p>  <p>26:24</p>	 <p>5:24</p>
<p><a href="#">OZEN Engineering</a></p>	 <p>OZEN Ansys ELITE CHANNEL PARTNER 42:33</p>	 <p>Using Lumerical FDTD Field Function (Designed for 300,000 and 8,000 nm) 11:21</p>
<p><a href="#">OASYS</a></p>	 <p>4:16</p>	 <p>1:46</p>
<p><a href="#">SIMQ</a></p>	 <p>5:53</p>	 <p>1:50</p>

**My Physics Café: CAE Analyst and a passionate blogger**

Well, hello there! I must have dozed off for a moment. Let's get back to work and put on our thinking caps because it's time to solve a problem. Who needs Sudoku when you've got finite element analysis, right?

**CAE Compass: Let's Solve A Problem**

Always check the blog for updates

In this article, we will discuss:

- 1) How CAE is used for solving real-world problems
- 2) Drop test example
- 3) Physics behind Drop test

**Solving a problem:** For the sake of simplicity, we shall define CAE roughly as – Solving industrial problems using principles of physics with the help of FEA softwares and some thinking. Why specifically 'Industrial problems'? What about other places?

Actually, CAE is not just limited to any typical Industry. It has scope everywhere including Research, Construction, Biomedical, Smart structure design, Surgical equipment design, Earthquake engineering and even Sports to name a few. But for now, let's focus only on the term industrial problems because it will be easy for us to simplify and also most of the working professionals you'll meet will be the ones doing CAE for industries, both large scale and small scale.

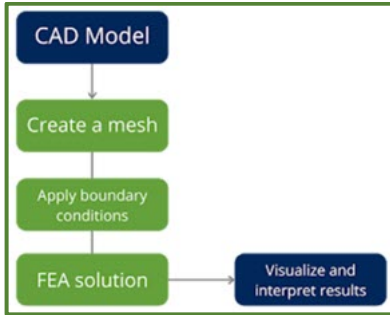
Now, imagine this - You decided to buy a brand-new Refrigerator on coming weekend. After shortlisting your favorite refrigerator, you want to transport it to your house from the showroom.

But a crazy thing happens. while transporting, the refrigerator gets dropped on the floor by one of the workers during handling (mishandling!). There's not much damage caused as it was well-packed and cushioned inside the box. However, after using it for few days, one day, you realize that the refrigerator's compressor has developed a leak.

If you remember your Engineering days - the compressor is a vital component of a refrigerator's cooling system, and it works by compressing refrigerant gas and circulating it through the coils in the fridge. If there is a leak in the compressor, the refrigerant can escape, which can result in a decrease in cooling efficiency or complete failure of the refrigerator.

This wouldn't have happened if that worker didn't drop your lovely refrigerator while transporting! But hey, relax. Such incidents are common, and they occur in everyone's lives. All you could do now is stop imagining further because overthinking is not much productive.

Designing the product (refrigerator in our case) in such a way that even if it falls from a height of one meter, the individual components comprising the product should remain intact or safe - this is the problem faced by Engineer's of that company now (because you gave your feedback about the product to the company) and this problem needs to be solved with the help of Design and CAE team..



As a CAE Engineer, you don't need to conduct hundreds of physical tests and arrive at the perfect design of the final product. Instead, you do it virtually by carrying out iterations/simulations so that ultimately the cost for number of physical trials is reduced. That's the magic of CAE. As we discussed in previous steps, carrying out these virtual tests or simulations requires a good knowledge of physics or principles governing the phenomena (Drop test) otherwise the solution you provide could go wrong.

**Example: Drop test:** To be more specific, a drop test is a type of test typically carried out on products that are prone to being dropped or experiencing impacts during their use or transport. These tests are designed to evaluate the product's ability to withstand drops and impacts and to ensure that they are robust enough to survive in real-world conditions..

Some common examples of products that undergo drop testing include mobile phones, laptops, tablets, consumer electronics, and packaging materials.

[On the website you will be able to view the video: Smartphone drop test ]

Coming back to our previous question - How do the 3 basic elements FIT together for solving a problem?

The answer in this case is very easy. First, you do some hand calculations for finding the final velocity (velocity of object the moment it touches the floor) which is calculated by balancing the Potential energy with Kinetic energy or  $\frac{1}{2}mv^2 = mgh$ .

Upon solving further, we get  $v = \sqrt{2gh}$  which is nothing but the final velocity. This value is given as an input to the falling object (say refrigerator). No matter how large the drop height is, the input velocity is always calculated by the above equation. This first step is only possible if you know how to balance out the energies or the physics behind drop/freefall - Fundamentals.

Before you begin the model set-up, you need to *imagine* how the object under study would act as this process saves significant amount of time required for analysis (and time is money).

You must first do a mental simulation of the phenomena. Such visualization gives a clear picture on behavior of the object like - which parts have higher chance of deformation upon impact, how changing the boundary conditions can affect the results or how will the run time get affected if instead of *Single surface* you defined *Surface to Surface* contact. - Imagination.

Next, all that stuff where you give the correct boundary conditions (as calculated), define the materials and properties to components, define the contacts between parts along with awesome modeling depends on how good, fast and accurate you are at using the tool (FEA Software) - Tool expertise.

I'm sure now you got some basic idea. This problem that we saw just now is only one normal drop test. There exists a number of physical tests and validation techniques in the real world where CAE Engineer's are required which requires expertise in various other FEA tools and mastery in underlying physics concepts.

If this doesn't sound interesting, you can switch to IT field like others.

**Good luck! P.S - A problem in CAE can be solved effectively and accurately with the help of checklists which I'll be sharing with you in coming articles.**





**AutoDesk** – Exciting announcement - You now have the opportunity to register for AU 2023 to be held in Las Vegas from November 13th to 15<sup>th</sup>

The Design & Make Conference. Imagine being part of the thousands of forward-thinking innovators. It will be filled with three action-packed days of invaluable insights, a strong sense of community, and boundless opportunities for exploration.

**Together, we can make anything!**



## THE DESIGN & MAKE CONFERENCE

The ways we design and make have always been connected by purpose. Now, we can connect the people, processes, and data, too.

AU is the conference where you can learn how to put the possibilities of Autodesk's Design and Make Platform to work. Together, we can make anything.

Shape the future of your industry - For three decades, AU has been at the heart of Design and Make industries.

It brings together innovators in architecture, engineering, construction, product design, manufacturing, and media and entertainment, to share ideas, advance industry practices, and explore opportunities for the future.

It's the conference for those who make anything. Join us.

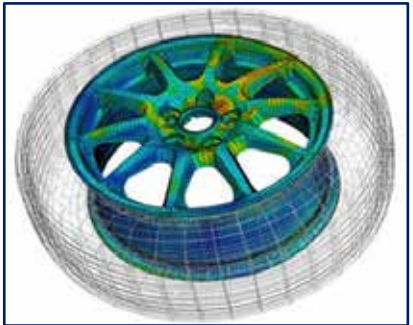
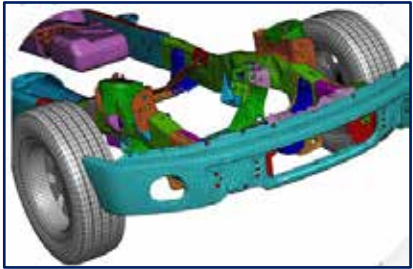
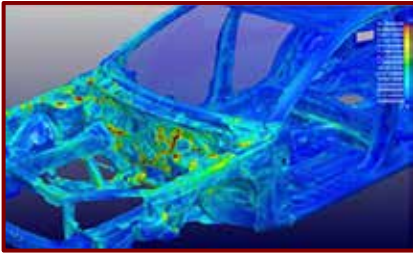
**Digital Pass** - Can't join in person? Tune in online from around the world. Pass includes:

- Live-streamed General Sessions and Industry Forums
- 30+ live-streamed classes and Theater Talks
- On-demand classes, community meetups, and more

**Visit the website to discover all the possibilities, download and get started with the tutorials**



**dfc-tech: PreSys** - An advanced multidiscipline CAE pre/post processing tool for building FEA models. PreSys is an engineering simulation solution for the development of finite element analysis models. It offers an intuitive user interface with many streamlined functions, allowing fewer operation steps with a minimum amount of data entry along the way.



**PreSys** - The ability to handle finite element modeling with clarity and ease.

Capability: Complete finite element modelling toolset

- Task manager guides the user through operations
- Surface auto meshing
- Boundary condition definition
- Multiple Mesh Generation
  - Allows variety of ways along the surface, curve, shell mesh, mesh face and other body stretched hexahedral meshes
  - For variety of regular meshes, by setting the geometry of the body and grid size; direct generation of a mesh is possible.
  - Generates a 4-node or 6-node tetrahedral mesh directly in a closed geometry, or in a closed shell mesh
- Material library
- Unlimited model size
- Direct interface with LS-DYNA, NISA, Moldex3D NEi Nastran, MSC NASTRAN
- Interactive mesh editing
- Model check and repair tools
- Continuous data error checking

**Model data displayed in a tree-structure**

- Quickly & efficiently access all model entities

#### Fully configurable user interface

- Native Windows XP/Vista/7 & 64-bit OS support
- High performance, OpenGL-based graphics
- Ability to open & control multiple models simultaneously
- Shortcut keys definable by user

#### Interfaces with CAD software via standard formats

- IGES, STEP, SAT, CATIA, DXF, UG NX, ProE, Solidworks & Parasolid
- Import/export capability

#### Complete results visualization

- Stress/strain contour plotting
- Animation of deformations & stress/strain data
- Graphing tools for complete data analysis
- 3D view application for stand-alone viewing of models & results

With almost 2 decades of experiences as an advanced CAE solution provider, we offer engineering solutions for vehicle crashworthiness, pedestrian safety, sheet metal stamping, drop test, blast analysis, computational fluid dynamics, electromagnetic, high/low frequency structure simulation and much more.

**Our engineering team are ready to serve our customers need for digital engineering transformation.**



**RESCALE – You don’t want to miss our blog by Ethan Rasa.** With automated high performance computing in the cloud for R&D, manufacturers can build resilient and agile supply chains while streamlining product development



**Excerpts - [Rescale Joins Microsoft Cloud for Manufacturing to Help Organizations Embrace Industry 4.0](#) by E Rasa**

Supercomputing for R&D, Automated - The Rescale management platform removes the complexity of running high performance computing (HPC) for research and development. By automating how organizations use the cloud to support their digital engineering needs, Rescale helps manufacturers accelerate their time to market, improve product quality, and reduce costs.

The Rescale platform simplifies all aspects of HPC for R&D, making it quick and easy for manufacturers to tap into the state-of-the-art computing power available on Microsoft Azure, including the H, F, and N VM series. This allows Rescale to offer its customers even more choice and flexibility when it comes to deploying HPC workloads in the cloud. With Rescale’s integration with Microsoft, manufacturers can digitally empower engineering teams to operate safe and agile factories while unlocking new revenue efficiencies and opportunities. With automated multi-cloud HPC orchestration from Rescale, manufacturers can take advantage of IoT, AI, and mixed reality technologies to drive new innovations, helping build more resilient supply chains and improve end-to-end visibility.

“We are excited to partner with Microsoft and join Microsoft Cloud for Manufacturing,” says Ethan Rasa, vice president of global technology alliances at Rescale...”

Rescale’s HPC platform is used by a wide range of manufacturers across industries, including aerospace, industrial, automotive, and electronics. The platform is used to run a variety of high-performance computing workloads, such as:

- Simulation: Manufacturers use HPC simulations to test new products and designs before they are built. This helps to reduce the risk of costly errors and delays.
- Analysis: Manufacturers use HPC analysis to gain insights into their operations. This helps them to improve efficiency, quality, and profitability.
- AI: Rescale integration with Azure provides the computing power needed to take advantage of AI to accelerate and improve digital engineering and design.

...



**Ethan Rasa is Rescale’s global vice president of technology alliances.** Before joining Rescale, he held corporate business development roles at Shutterfly and Calypso Technology, where he was responsible for building and scaling successful partnerships, driving revenue growth, and increasing market share....

**DYNAmore: Join us at the 14th European LS-DYNA Conference.**

We extend a warm invitation to all LS-DYNA users. Mark your calendars for Oct. 18 & 19, 2023. We are holding the event in the beautiful city of Baden-Baden. We have arranged a get-together on the evening of October 17. This gathering offers a fantastic opportunity to relax and prepare for the coming two days while fostering valuable connections with familiar and fresh faces. Take advantage of this exciting occasion!

[The conference](#) serves as the focal point for LS-DYNA in Europe, offering a central platform that brings together industry experts, academia, and international participants. You will have approximately 200 technical presentations, captivating keynotes from renowned speakers, a vibrant exhibition, and a diverse attendee base, this event truly stands out as the premier LS-DYNA gathering on the continent.

- Tuesday, 10/17/2023 from 6:00 pm Get together in the exhibition
- Wednesday, 10/18/2023 from 8:00 am Conference day 1
- Wednesday, 10/18/2023 from 7:00 pm Gala Dinner
- Thursday, 10/19/2023 from 8: 00 am Conference day 2

**[DYNAmore Training Information](#)****Seminars**

Sept 11 -	LS-OPT - Optimization & Robustness	Katharina Liebold, Charlotte Keisser
Sept. 12,19,25	Introduction to LS-DYNA	Dynamore staff members
Sept 12	ALE and FSI	Mhamed Souli, Julien Lacambre
Sept 14	Modeling Metallic Materials	Dynamore staff members
Sept 14	Smoothed Particle Hydrodynamics	Mhamed Souli, Jingxiao Xu, Julien Lacambre
Sept 22	CPM Airbag Modeling	Sebastian Stahlschmidt, Steffen Mattern
Sept. 25	Implicit Analysis using LS-DYNA	Tobias Erhart, Pierre Glay, Christoph Schmied
Sept 27	CESE Compressible Fluid Solver	Iñaki Çaldichoury
Sept 28	Discrete Element Method	Maik Schenke
Sept 29	Simulation of thermoplastics	Martin Helbig

**Webinars**

Sept 11	LS-DYNA Compact: Joining Techniques in LS-DYNA	Tobias Graf, André Haufe, Markus Feucht
Sept 18	LS-DYNA Compact: Damage and Failure	Filipe Andrade
Sept 25	LS-DYNA Compact: Introduction to LS-PrePost	Silvia Mandel
Sept 20, 27	LS-DYNA Compact: Introduction to LS-DYNA	Dynamore staff members
Sept 20	LS-DYNA Compact: User Interfaces in LS-DYNA	Tobias Erhart
Sept 21	LS-DYNA Compact: Introduction to Isogeometric Analysis with LS-DYNA	Stefan Hartmann, Lukas Leidinger

**Information Days**

- October 04th Optimization / DOE / Robustness
- October 11th Multiphysics - Maik Schenke
- November 22nd Human Modeling
- November 24th Process Automation/SDM





**CADFEM India: Don't miss my YouTube video that sheds light on the awe-inspiring advancements in The Indian Space Policy.** The Indian Space Policy has taken a giant leap forward, empowering the private sector to join hands in shaping our nation's space endeavors. Let's celebrate this major milestone as we witness the fusion of technology and private enterprise in propelling India towards the space!



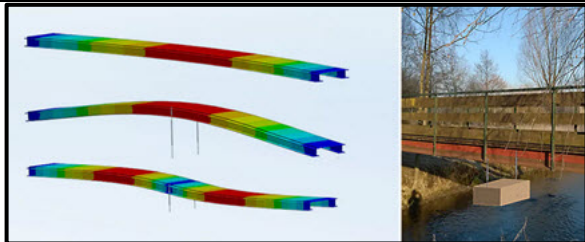
[YouTube](#) – Unlocking boundless opportunities with Dr.-Ing. Madhukar Chatiri, CEO of CADFEM India on DD News at SMOPS 2023 Bengaluru, who sheds light on the game-changing benefits of this policy for Indian private companies.

According to Dr.-Ing. Madhukar, this long-awaited policy has opened doors to unprecedented opportunities.

From building satellites and rockets to data collection and dissemination, the private sector can now actively contribute to the entire space value chain.

He emphasizes that every company, whether small or a startup, will reap immense benefits from this policy. The learnings and support from ISRO will provide a significant advantage, facilitating innovation, research, and development in the indigenization of products.

The policy clearly outlines the need for investments in the value chain, and this is where CADFEM India come in. As a leading system integrator and solution provider, we offer tailor-made solutions for each initiative, ensuring the success of India's ambitious space missions.



**Designing vibration damping with Ansys Mechanical**

The classical task of structural mechanics is to design stiffer or lighter structures for obvious reasons. Damping, on the other hand, is often perceived as something hardly tangible. It is little known how elegant damping of assemblies can be simulated and thus creatively designed to reduce vibrations



**Congratulations to Team CADFEM India** on their remarkable victory at the “Ansys North Sports Meet” tournament. Your exemplary cricket skills were on full display, leading you to emerge as the well-deserved champions.

A big shout-out goes to Narendra Rana for his outstanding performance, earning him the well-deserved title of Man of the Tournament.



**RBF Morph – “So proud to see our technology growing within the Ansys family!”**

According to Prith Banerjee “These state-of-the-art tools are able to address the most challenging applications in any industry using the predictive power of simulation.”

We are ready for this new chapter of our long-lasting cooperation.



**Ansys and RBF Morph join forces to bring state-of-the-art mesh morphing technology to multiple industries**

After a long and successful OEM partnership with Ansys, **RBF Morph has two proprietary products featured among the world simulation leader’s offerings:**

**Ansys RBF Morph Fluids & Ansys RBF Morph Structures.**

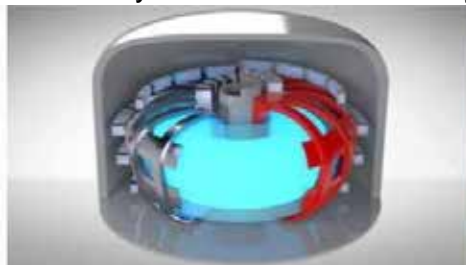
The two simulation tools are based on RBF Morph’s 10+ years of experience with 100+ global customers, including some of the top players and OEMs in the automotive and aerospace industries.

**Radial Basis Functions (RBF) are considered by the scientific community one of the best mathematical tools for mesh morphing, a technique used to modify or deform a geometric mesh while maintaining its overall structure and characteristics.** This approach is crucial in developing safety-critical complex applications in the automotive, aerospace, and medical industries. Thanks to mesh morphing, companies can substantially reduce computational time while performing highly automated design optimization analysis, increasing products’ reliability and performance while cutting costs, delivery time and environmental impact.

Today’s products represent cutting-edge mesh morphing technology that can help companies optimize their products and achieve optimal efficiency within the Ansys simulation platform.

**Ansys RBF Morph Fluids** is an add-on that allows for automated shape optimization studies entirely within Ansys Fluent, leveraging morphing of the existing mesh. This new approach takes advantage of Ansys Fluent’s CFD technology and overcomes the limits of the mainstream methods by implementing dedicated morphing routines directly into Ansys Fluent’s CFD code.

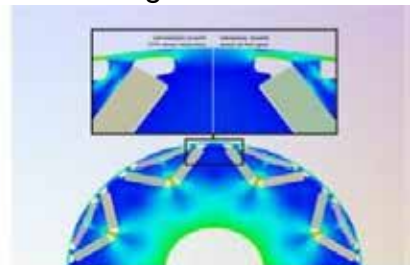
**Ansys RBF Morph Structures** is an ACT extension that allows for automated shape optimization studies entirely within Ansys Mechanical and Ansys Workbench by morphing the existing mesh.



**Nuclear Fusion**



**Medical Digital Twin**



**Electric Motor**



### The main advantages of RBF mesh morphing are:

- The capability of handling any mesh, making it very flexible and usable in any situation
- Fully integrated with Ansys CAE solvers, with a seamless user experience
- No need for re-meshing and highly parallelizable to significantly cut computational time
- Robust process, used for decades by top players in the industry with proven cost cutting and improved performance results, up to a 5x factor

“Thanks to our partnership with RBF Morph, Ansys can offer users an advanced solution for mesh morphing that integrates seamlessly into the Ansys platform,” said Prith Banerjee, Chief Technology Officer at Ansys. “These state-of-the-art tools are able to address the most challenging applications in any industry using the predictive power of simulation.”

**“We have been proudly serving Ansys users since 2009,” said Marco Evangelos Biancolini, RBF Morph’s Founder and CTO. “We started with CFD, an Add-On for Fluent and since then we gradually expanded our integration within the Ansys product family: Ansys Mechanical, Design Explorer, Twin Builder, optiSLang and LS-DYNA.** Today we have two solutions fully integrated with Ansys Fluids and Ansys Structures to enable the best multi-physics optimization and digital twin creation. The expanded OEM arrangement marks a new chapter in our cooperation with Ansys and will allow to jointly replicate the successes we have been bringing to 100+ Ansys customers.”

About RBF Morph: RBF Morph is a pioneer and leader in mesh morphing, a key technology used in engineering simulation that combines very accurate control of the geometrical parameters with extremely fast mesh deformation, fully integrated into the solving process. Our mission is the development and broad application of simulation technology to synthesize and optimize designs, processes, and decisions for our customers who need to achieve optimal efficiency. RBF Morph offers two products jointly with Ansys: Ansys RBF Morph Structures and Ansys RBF Morph Fluids. These products are fully integrated with Ansys Fluids and Ansys Structures. Thanks to integration with optiSLang, we can provide a complete solution for optimization. RBF Morph is based in Monte Compatri, Rome, Italy. Visit [www.rbf-morph.com](http://www.rbf-morph.com) for more information.

### Press Contacts

(Europe) BF Morph srl, Clara Zambetti, Head of Communications. ([clara.zambetti@rbf-morph.com](mailto:clara.zambetti@rbf-morph.com))  
(U.S.) - Parker Group PR, Inc, Lynn Manning, President ([team@parkergroup.com](mailto:team@parkergroup.com))





**CADFEM:** The development of an active mobility solution, such as the Vigoz offered by the start-up CIXI, requires rapid development based on various physical methods and tools, ranging from static linear analysis with Ansys Mechanical to normative crash validations with Ansys LS-DYNA and thermal analysis.



**Crash test simulation of an active vehicle:** To ensure the required level of safety for the driver, this active vehicle has been subjected to numerous crash tests and its design has been re-adapted. (Images: © CIXI)

The start-up program from which they benefited enabled them to meet regulation requirements as well as comfort and optimization requirements. From a passive safety perspective, the Vigoz aims to validate crash tests for M category vehicles.

Summary - Lucas Guilié - Structural analysis engineer, CIXI - "We used the LS-DYNA tool to model the seat and the belt as well as to study the biomechanical criteria for the driver to ensure that it would be truly safe while driving. The CADFEM support was exceptional, giving us quick feedback. Thanks to these exchanges, we've managed to develop digital tools together that are now very effective and help us every day in our developments."



**Task** - CIXI is a start-up whose ambition is to make active mobility intelligent and environmentally friendly. To do so, it aims to reintegrate physical activity into daily commute. In order to build a more sustainable future, CIXI's mobility solutions reduce the impact on the environment and improve the mental and physical health of users. The Vigoz is a vehicle that allows active travel with a low carbon footprint and the comfort of a car.

Users can travel fast, safely, and in a weatherproof manner, while pedaling (up to 120 km/h) on roads previously reserved for cars. The Vigoz also offers a unique driving experience thanks to CIXI's pedaling and rolling technologies.



**Solution** - The meshing and data setting of the model are initially performed with the Ansys Mechanical tool. The integration of the dummy and the modeling of the belts are performed with the LS-Prepost tool. Front and rear crash tests are performed. They allow the measurement of the vehicle's performance both from a structural point of view, such as intrusions, as well as from a biomechanical point of view, such as the measurement of the HIC. They also allow for dimensioning of the seat and belt anchorage points.





Initially, front and rear crash cases are performed without the dummy being integrated into the vehicle. From these models, the performance of the vehicle structure and the accelerations undergone by the seat are measured. In a second step, a sled test sub-model, consisting only of the seat and the Hybrid III dummy, is performed. The seat accelerations are then applied to this sub-model. From this model, the biomechanical criteria can be established. It is also from this model that the performance of the seat can be observed and optimized. The forces induced by the crashes are measured and then used in static analyses to optimize the seat structure. The various dynamic simulations made it possible to correctly position the belt anchorages and observe the pretension forces. In addition, the criteria needed for approval were measured to determine whether the vehicle meets the requirements. Finally, the driver in this active vehicle is in a greatly reclined position, so the simulation was able to highlight a submarining phenomenon. From this observation, technical solutions were added to counter this undesirable phenomenon.

**Customer Benefit - By using Ansys LS-DYNA, CIXI was able to quickly obtain valuable information on the performance of its products with respect to the normative framework to be complied with.** The use of numerical simulation has also allowed for detailed optimization of parameters or shapes that would not have been possible if the development had been based solely on physical tests. Conducting crash tests with a dummy on board is very time-consuming and costly, but thanks to digital simulation, CIXI was able to carry out numerous crash tests using virtual dummies. This increased the number of designs tested and produced a more successful product at a lower cost. Without Ansys-LS-DYNA, the number of prototypes required would have resulted in much higher development costs and time-to-market. Ansys LS-DYNA has enabled CIXI to obtain an active vehicle with a highly satisfactory level of driver safety. Thanks to the start-up program, CIXI had access to a very broad product portfolio. The company has not only limited itself to crash applications. Instead, it has used simulation in several fields. This is the case, for example, for heat transfer issues or the use of topological optimization as a design aid. Within a company, integrating simulation into the product development process is not an easy task. CIXI was able to rely on CADFEM teams for training on the use of simulation and was also able to visit CADFEM engineers in various workshops to monitor their developments. They were also able to call on technical support to answer questions or exchange ideas about the methodology.

MARKETING & COMMUNICATION



**Elise Deville**

+33 / 670 46 38 80

elise.deville@cadfem.fr



**CADFEM: Don't miss our 2-day seminar** where you will deepen your knowledge in the everyday use of Ansys Fluent and learn to carry out efficient and reproducible CFD analyses independently. It offers practical examples from a wide range of applications. You will learn the possibilities for automation, handling complex problems and methods for systematic evaluation and quality assurance. **Join us!**



**110% Ansys CFD – Efficient Usage of Ansys Fluent Includes current features and best practice**

In addition to the necessary theoretical basics, the focus is on practical exercises with the software in order to apply the workflows directly and to support you together with tips, tricks and solutions in everyday simulation.

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**Excerpt Day 1 – visit our site for complete information**

- 01 CFD workflow best practices
- 02 Working efficiently with automation
- 03 Handling complex CFD problems
- 04 Physics-based mesh adaption and motion modeling

**Day 2**

- 05 Overset-Meshing and gap flows
- 06 Numerics and quality control
- 07 Temperature and multi-component effects
- 08 Data analysis and visualization



**Oasys: Software Used on this Project: Structural Suite & GSA.**

The original Pont-ar-Ddyfi (Dyfi Bridge) in Machynlleth, North Wales, forms part of the A487, which is the principal strategic south to north route along the west coast of Wales.



**Case Study - [Parametric bridge analysis using Oasys GSA: A487 New Dyfi Bridge, North Wales](#)**

**Project Overview** The old masonry arch structure was not designed to carry the volume of traffic currently experienced on the trunk road and frequently had to be closed during large flood events due to safety concerns, so improvements had to be made to increase the resilience of the A487.

The A487 New Dyfi Bridge scheme includes a new 725m long steel-concrete composite viaduct crossing the Afon Dyfi (Dyfi River) and adjacent flood plain. Arup engineers used Oasys GSA alongside Grasshopper, Speckle and GeometryGym for the analysis of the structure.



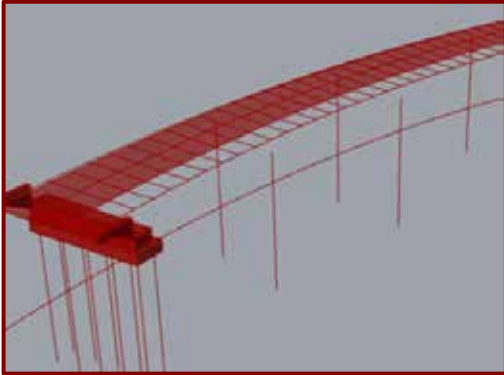
The new design aims to make it easier to cross the river Dyfi, allowing for easier access to employment opportunities, healthcare, and education (during closures of the existing bridge there is a 30-mile diversion for some residents to access local provisions). It also aims to make the A487 safer by helping to prevent flooding and thus, preserve historic landmarks and buildings.

**How Oasys proved invaluable:** The proposed structure is made up of three different structural forms: a curved ladder deck with an insitu concrete slab, a straight push launched ladder deck with precast concrete panels, and braced pairs over the river, with omnia panels and an insitu topping. Due to the complexity, Arup engineers wanted to ensure that they avoided duplication of effort and use each tool for what it was best at.

**To do this a parametric workflow was adopted.**

The basic geometry was first defined as a stick model in Grasshopper and passed, via Speckle, to create both the BIM model and the GSA global analysis model. The links between the software were seamless and made it easier for the engineers in the analysis stage of the project to react to downstream design changes, such as updated highway alignments.

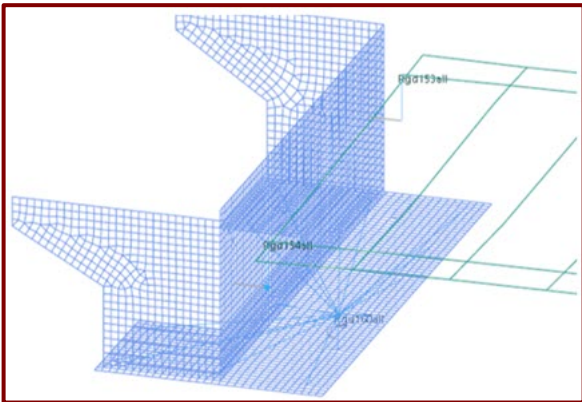




(Fig. Stick Model exchanged via Speckle) Due to the structural form, hundreds of different section properties had to be defined and explicitly calculated for the structure. This process was automated using spreadsheets, which were easily loaded into the global analysis model Grasshopper script, combined with loading information and the Speckle geometry data to create a GSA model (using GeometryGym plugin). This process allowed quick updates of the GSA model, resulting in an efficient design process.

With the API and Grasshopper plugin, there is less of a need to use third party plugins, making it quicker and more seamless for engineers to extract results.

The GSA model contained meshes for abutments, 6x6 springs for foundations, joints for the different bearing articulations and elements for the different members – all created parametrically within Grasshopper.



(Fig. Final GSA Model) - The engineers involved in this project believe that this is an improved process that they are now adopting, and further refining, across other projects.

“For this project we stuck with GeometryGym to assemble the GSA model in Grasshopper, as we knew it well. But we’re excited that Oasys have now released the new API and their own Grasshopper Plugin as it will allow us to further refine the workflow and open new doors with quicker and easier results extraction.” – Matt Smith, Bridge Engineer at Arup.

This webinar focuses on using Grasshopper, a visual programming interface that provides a low-level entry to engineers to start coding. We take you through the steps of setting up a typical workflow; going from an **analysed GSA model with results, over to AdSec to perform detailed concrete section analysis and optimisation, and then back again to GSA with updated section modifiers.**



[Watch the webinar on YouTube](#) or on the website with additional information on the case study and additional graphics.



**Oasys LS-DYNA Environment YouTube Webinar - [LS-DYNA submission from Oasys PRIMER, checking dyna output files and load profiling](#)** This webinar covers LS-DYNA Submission from Oasys PRIMER, exploring powerful tools for optimizing simulations and analyzing results. Learn to navigate output files, validate models, analyze errors, and visualize load profiles. Enhance your LS-DYNA workflow with Arup’s expertise and Oasys PRIMER’s capabilities.





### Oasys

Did you know that **Oasys LS-DYNA Environment manuals are now available in an online portal?**



### Oasys LS-DYNA Documentation

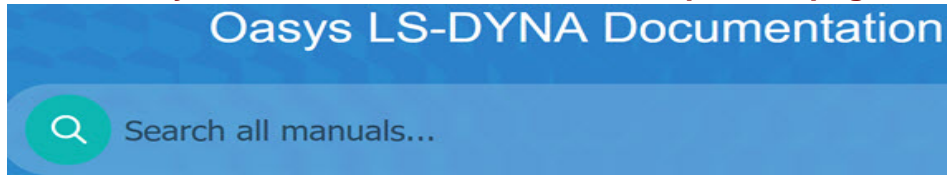
Explore

We are continuously striving to enhance our user experience, therefore, we are excited to announce the launch of our newly upgraded online portal for manuals.

This advanced platform offers a host of capabilities designed to make accessing and utilizing our documentation easier and more efficient.

For complete information on the above: The website page conveniently links to each of the above areas with a click on the icon.

**Additionally a search box is located at the top of the page**



**The centerpiece of this upgrade is our much-enhanced search functionality.**

We've integrated Google Translate into our platform, which opens our resources to a broader global audience, allowing users around the world to benefit from our comprehensive documentation.

**Additional Links on our page available to help you**

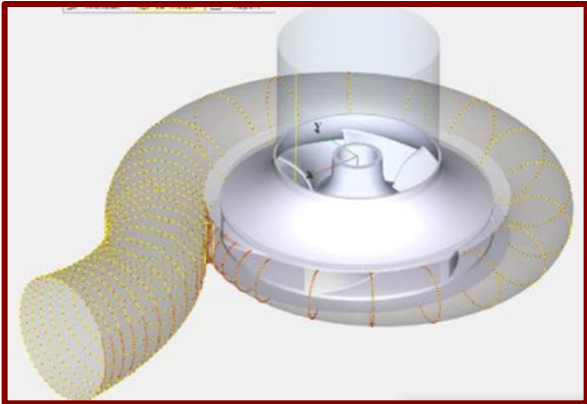
- Getting Started
- Tutorials
- Training Courses
- Downloads
- Oasys LS-DYNA YouTube
- Webinars
- Top Tips
- Customer Support

Stay tuned for further updates and enhancements as we continue to evolve our manual delivery system to better serve our valued users.



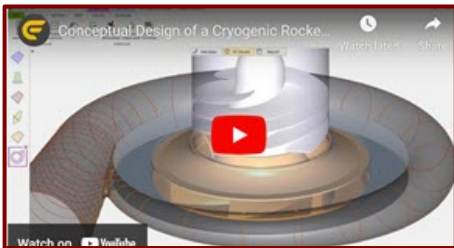
**OZEN Engineering: Learn more about CFturbo**, a knowledge-based design, simulation and optimization software for turbomachinery parts and systems. Users may select to work on the design of a pump, turbine, compressor, fan and/or blower which may axial or radial.

**Introducing CFturbo : A Turbomachinery Design Software**  
**By Mert Berkman**



The workflow starts with the user entering design point conditions such as flow rate, total pressure difference, rotational speed, fluid properties and inlet conditions. The software uses fundamental equations and empirical correlations to come with a very reasonable initial design for turbomachinery systems. At the end of the workflow the tool will produce a 3D CAD model for further analysis and/or design tuning.

**CFturbo is integrated into Ansys simulation toolkit.** A bi-directional coupling between CFturbo and Ansys WB is available where information from CFturbo to CFX, Fluent or Mechanical can flow seamlessly. CFturbo may also be integrated via Ansys optiSLang for design optimization.



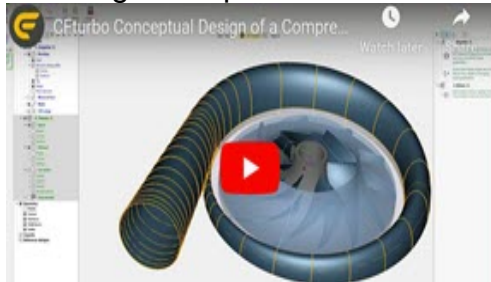
YouTube Link [The video On our website and YouTube describes the workflow for a turbopump](#)

Visit our site for the videos below.

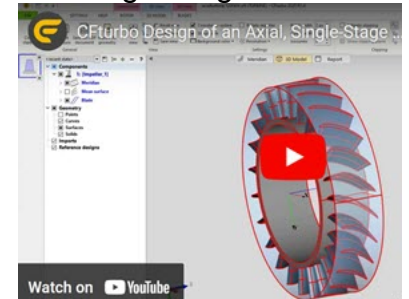
The 14-minute video shows the application on an axial fan design



CFturbo may be used to design a centrifugal compressor



The final video is an example of a single stage turbine.

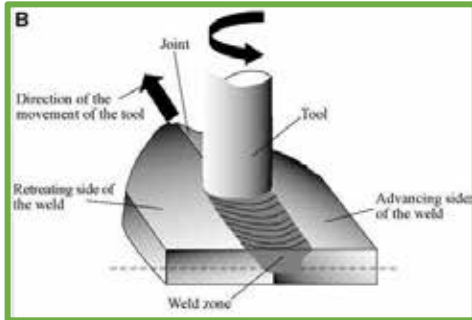


**The website has the complete information including formulas**



**OZEN Engineering: Learn how to use LS-DYNA's Smooth Particle Hydrodynamics (SPH) method to simulate a friction-stir welding process.**

Friction stir welding (FSW) is a solid-state joining process that creates high-quality welds in metals, primarily aluminum and its alloys. It involves a rotating tool that plunges into the joint between two workpieces.



**Friction-Stir Welding Using LS-DYNA Smooth Particle Hydrodynamics (SPH) by: Kamil Koyunlu**

**Friction Stir Welding (FSW)** - The tool generates heat and softens the material without melting it. As the tool rotates, it stirs and mixes the softened material, forming a solid-state bond. FSW has advantages such as minimal distortion, and the ability to join dissimilar materials. It is used in the aerospace and automotive industries to manufacture strong and reliable components.

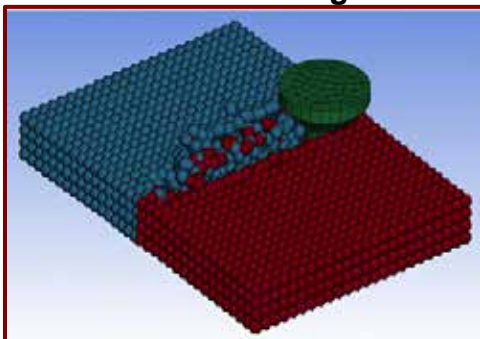
**LS-DYNA Smooth Particle Hydrodynamics (SPH)**

- The SPH method is a Lagrangian mesh-free numerical technique that can be used to simulate different physics from fluid dynamics problems as well as for structural problems that contain high speed and large deformation.
- This method discretizes the continuum domain into particles, where each particle carries certain properties like mass, velocity, and other relevant variables.
- Like FEM Method, the SPH method solves conservation equations to solve for velocity, pressure and energy.
- These particles interact with each other based on the smoothing function (SPH kernel function), which determines the rate of change of influence neighbouring particles each other.

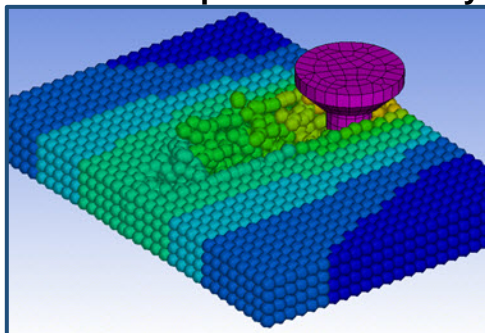
$\frac{d\rho}{dt} = -\rho \cdot \nabla \cdot \vec{v}$ $\frac{d\vec{v}}{dt} = \frac{1}{\rho} \cdot \nabla \cdot \sigma + f_{ext}$ $\frac{de}{dt} = \frac{1}{\rho} \cdot \sigma \cdot \nabla \cdot \vec{v}$	<p>Support domain</p>	
Conservation Equations	Support Domain 2D Representation	Kernel function 2D Representation

**On our website:** View the below animations illustrating friction stir welding simulation utilizing SPH

**Friction Stir Welding Result**



**Friction Stir Temperature Result by time**



**For a comprehensive understanding of the modelling process, we recommend our website demo video, which can provide additional valuable insights.**



**DYNAmore: Join us for a two-day online seminar in English and Swedish, starting on Sept. 19.** The seminar will delve into "**From Explicit to Implicit Simulation Models in LS-DYNA.**" In the dynamic world of product development, meeting diverse demands such as crash safety, durability, and passenger comfort in vehicles is crucial.

Don't miss this opportunity to enhance your knowledge and skills in this essential area.



**Instructor**

### "From Explicit to Implicit Simulation Models in LS-DYNA."

In a CAE-driven development process, this puts high demands on the multi-disciplinary capabilities of analysis tools. The one-code strategy of LS-DYNA provides a complete solution for these demands, making it possible to use the same analysis model for many different load cases, from large deformation rapid events like drop test and crash analyses to non-linear quasi-static analyses, and linear dynamics in the frequency domain.

Many possibilities exist, to reuse the same models developed for rapid events and explicit time integration also for non-linear quasi-static analyses and linear statics with only minor modifications, and many users could benefit from taking advantage of these.

This course addresses the conversion of an existing explicit LS-DYNA model to an implicit version of it. In detail, it focuses on how to set up non-linear implicit analyses in LS-DYNA starting out from explicit (crash-worthiness-type) models. It is a hands-on course with many workshop examples, ranging from the basic setup of linear stiffness analyses to more involved non-linear sub-system analyses. Practical troubleshooting tips and guidance on how to avoid many common pitfalls are also given.

No previous knowledge of implicit analyses in LS-DYNA is required, as the course starts out on a basic level in this field, but basic knowledge of LS-DYNA or prior attendance at the seminar "Introduction to LS-DYNA" is recommended.

### **Content**

- Basic set-up using control card templates
- Contacts
- Multiple load steps
- Elements and materials for implicit analyses
- Advanced set-up: possible control card modifications
- Troubleshooting convergence issues
- Conversion examples





**d3VIEW:** Scientists from the early ages until now have relied on experiments to better understand nature. Today, as simulations drive product-development, experiments continue to play an important role in improving our simulations. d3VIEW, from its earliest versions, has focused on providing a unified and simple to use platform to store and manage experimental data across sciences and most importantly to overlay Test vs CAE to increase our understanding of simulations.

d3VIEW, has focused on providing a unified and simple to use platform to store and manage experimental data across sciences & to overlay Test vs CAE to increase our understanding of simulations.



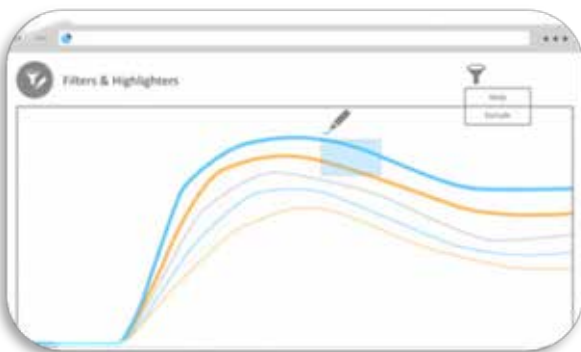
Simlytiks® unites exploring, sharing and analyzing data into one application

**D3View - one Platform offers you 12 different applications to interpret your data for your design process.**

**Enhance the Experience of Exploring Data.**

Simlytiks - It uses extensive visualization tools to hone in on specifics, trends, patterns or just the most important aspects of large or small datasets.

Because of this, Simlytiks creates stories from your data, so you can understand what is working and what needs improvement.

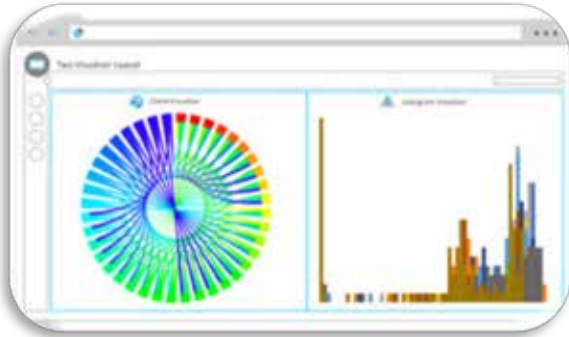


**Extensive Visualization Tools**

Clarify data with visualizations to answer questions that enhance, refine or reshape products, services, etc.

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Train, predict and identify data trends or patterns easily with A.I. and Machine Learning integration.



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Apply and save visually distinct colors through out all visualizations in a data set.

Utilize options to animate information and responses.

Use grid layouts to easily compare up to 16 different visualizations on one page, and create as many pages as needed to explore with multiple layouts.



**Platform Integration** - Simlytiks seamlessly integrates with other applications on the platform so no matter how you are reviewing your data, you can always delve into and disseminate it vividly and efficiently.

Compare records from simulations with records from physical tests directly.

Visualize and explore database records, and examine them further by applying view templates.

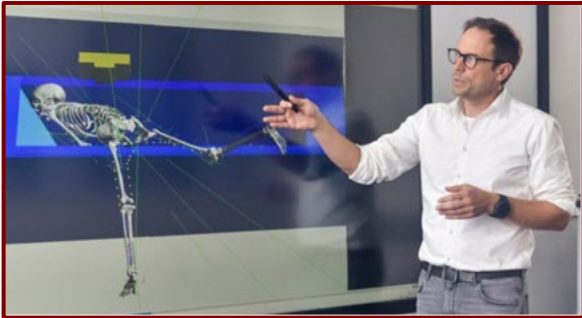


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**University of Stuttgart:**

**Acquittal in the "bathtub murder" trial.** Prof. Syn Schmitt and Prof. Niels Hansen, "We are pleased that we were able to make an important contribution to this trial with simulation science"



[Picture: University of Stuttgart/Kovalenko]

**"Bathtub murder": Acquittal following expert testimony by simulation researchers** - Stuttgart scientists reconstructed fall and narrowed down the time of death. This allowed the case to be reopened.

Expert testimony from Professors Syn Schmitt and Niels Hansen from the Cluster of Excellence "Data-integrated Simulation Science (EXC 2075, SimTech) at the University of Stuttgart aided the acquittal of **63-year-old Manfred Genditzki, who spent more than 13 years wrongly imprisoned.**

Using a new computer-based biomechanical simulation method and thermodynamic calculations, they were able to prove that the then 87-year-old woman could have fallen into her bathtub without any outside interference and died from the consequences of the fall at a time when the defendant had an alibi. This evidence was compelling enough to lead to an acquittal.

"This is the first case in Bavaria, where a life sentence has been revoked as the result of a retrial. Genditzki's acquittal is a historic victory," said Hamburg lawyer Dr. Gerhard Strate. The Stuttgart simulation methods played a significant role in this.

Lieselotte Kortüm was found dead in her bathtub in 2008. The janitor of the housing complex where she lived, Manfred Genditzki, was accused of her murder. Although he was able to refute the original charge of stealing money, he was found guilty of murder. The victim had two bruises on her head, and because of these, it was assumed that a fight had taken place between her and Manfred Genditzki. However, Genditzki the latter protested his innocence throughout.

After four years in prison, lawyer Regina Rick took over Genditzki's defence and, among others, commissioned Professor Syn Schmitt of the University of Stuttgart to provide an expert testimony in order to ensure the case was reopened. Schmitt conducts research on the simulation of biomechanical systems in the SimTech cluster of excellence. He was first requested as an expert witness by the defense counsel during the appeal in 2011, but this was rejected by the court at the time. But in the meantime, the method developed by the Stuttgart scientists was recognized by the Munich Higher Regional Court and this is the first time it has been used in a forensic medical report.

**Biomechanical and thermodynamic expert testimonies** - In August 2022, after hearing the experts, the Munich I Regional Court ruled that a retrial was justified and that a new hearing must be held. Genditzki, who was convicted of murder and had been in prison for more than 13 years, was released immediately due to a lack of evidence. This was mainly justified by the changing evidence situation, due to the expert biomechanical testimony from Schmitt, and expert testimony on thermodynamics from Professor Niels Hansen, also a simulation scientist at the SimTech Cluster of Excellence. Hansen conducts research on engineering thermodynamics and thermal process engineering and helped narrow down the probable time of death to specific times when the janitor had an alibi.



**Prof. Niels Hansen**

**A pioneering case** - All simulations led to the same result: A fall without external impact was probable, meaning the cause of death was likely to have been an accident. "Our method is able to objectively and transparently investigate what movements are possible depending on the laws of physics," explains Syn Schmitt. Niels Hansen's experiments and theoretical calculations to narrow down the water temperature at the time the body was found also exonerated Manfred Genditzki. An established procedure for temperature-based time-of-death estimation based on this established the probable time of death far outside the time of death that had previously been assumed. "The thermodynamic analysis was thus an important component and could be used in other processes," says Niels Hansen on the outcome of the process.

### **Numerous simulations created to reconstruct the possible scenarios**

Syn Schmitt's team ran numerous simulations to reconstruct possible scenarios in the bathroom. Using the deceased woman's biological data, such as height, weight, specific weight distribution in elderly people, and bone length, the scientists designed a person-specific model and reconstructed what happened. The question was whether a fall without any external influences might lead from the initial position - woman standing in front of the bathtub - to a final position that corresponds to how the victim was found. Final state refers to the body as it lay in the bathtub, with two bruises on the head, the dead person's shoes and a cane in front of the tub.

### **About the Cluster of Excellence "Data-integrated Simulation Science (EXC 2075, SimTech)".**

The Cluster of Excellence EXC 2075 "Data-Integrated Simulation Science (SimTech)" is an interdisciplinary research network with more than 200 scientists working together towards one goal: A new class of modeling and computational methods that take the use of simulation and data to a new level and make them available for various applications.





Hans, RheKen & their dog HanRhe News  
**I'm a human body model from DYNAmore** visiting Rheken  
**RheKen, is the town AI reporter**  
**HanRhe is our dog** and we spell it Henry.  
 He was chasing a car tire. I saved him from a tire impact injury.

August



[I have a newsletter? – I call it Hans](#) (Yeehaw! I learned to yell that from the Old Cattle Rancher)  
[RheKen has a pdf newsletter? – She calls it RheKen](#)

[The preliminary agenda for the 14th European LS-DYNA Conference is online.](#)

**Below is a list of a few of the presentations - one is dedicated to me, HANS!**

- **This is Hans I**  
**A. Gromer, D. Freßmann (DYNAmore)**
- Meshless Methods in Workbench LS-DYNA  
 Y. Novozhilov, (Cadferm)
- NHTSA Test Data Analytics - Lessons learned and Data Insights  
 S. Bala, (d3View)
- Battery Performance Evaluation using Workflows for Tests and Simulations with AI  
 S. Bala (d3View)
- Update on Recent Material Calibration Capabilities in d3VIEW  
 S. Bala,(d3View)
- Use of LS-DYNA for detailed modelling of segmented concrete tunnel linings  
 R. Sturt, A. G. Montalbini (Arup)
- Thermal Runaway in Electric Vehicle Crash Simulation using LS-DYNA  
 P. L'Eplattenier, I. Caldichoury, K. Kong, V. Challa, D. Bhalsod, S. Adya, M. Howard (Ansys)
- Rendering of LS-DYNA results with Blender integrated in SCALE.sdm –  
 (M. Thiele, SCALE)
- Modeling net capture of an object in LS-DYNA - A. Shreiber,  
 L.-H. Drory (Rafael Advanced Defense)
- A New Model Reduction Method for Vehicle Crash Simulation –  
 S. Hayashi, S. Hiroi, N. Shimizu (JSOL)
- Full-field ROM generation with LS-OPT, LS-DYNA and Twin Builder –  
 N. Stander, A. Basudhar, V. Morgenthaler, C. Grivot (Ansys)
- Improvements of LS-DYNA ICFD's two-phase level-set solver –  
 Z. Solomenko, F. Del Pin, I. Caldichoury, R. Paz, P. Huang (Ansys)
- Streamlining prosthetic heart valve simulation, from stent positioning to fluid structure interaction –  
 Facundo del Pin (Ansys)



**The conference rooms below bear the names of town current and legendary guests.** These names are synonymous with groundbreaking simulation development.

Each room name represents a unique person and simulation technology. Grab your coffee and mark your calendar not to miss these rooms at **the 14th European LS-DYNA Conference, Oct. 18th & 19th, 2023.**

### Day 1, Wednesday, October 18th, 2023 - PLENUM "Hallquist"

- PARALLEL SESSIONS A 1 - 3

(Wed., Oct. 18th, 10:45 am - 12:50 pm)

Room I	"SWANSON"	CRASH
Room II	"SCHWEIZERHOF"	OCCUPANT SAFETY

- PARALLEL SESSIONS A 4 - 6

(Wed., Oct. 18th., 10:45 am - 12:50 pm)

Room VIII	"SHAPIRO"	Multiphysics II
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- PARALLEL SESSIONS A 7 - 9

(Wed., Oct. 18th, 10:45 am - 12:50 pm)

Room VIII	"STANDER"	SDM I
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- PARALLEL SESSIONS B 1 - 3

(Wed., Oct. 18<sup>th</sup>, 2 pm - 4:05 pm)

Room I	"SWANSON"	BATTERY / ELECTRIC VEHICLE I
Room II	"SCHWEIZERHOF"	HUMAN BODY MODELS

- PARALLEL SESSIONS B 4 - 6

(Wed., Oct., 2 pm - 4:05 pm)

Room VI	"SHAPIRO"	IGA I
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- PARALLEL SESSIONS B 7 - 9

(Wed., Oct. 18th, 2 pm - 4:05 pm)

Room VIII	"STANDER"	WORKSHOP I
Room IX	"WALKER"	WORKSHOP II

- PARALLEL SESSIONS C 1- 3

(Wed., Oct. 18th, 4:45 - 6:00 pm)

Room I	"SWANSON"	PARTICLE METHODS
Room II	"SCHWEIZERHOF"	POINT CONNECTIONS

- PARALLEL SESSIONS C 1- 3

(Wed., Oct. 18th, 4:45 - 6:00 pm)

Room V	"NILSSON"	WELDING / HEAT TREATMENT
Room VI	"SHAPIRO"	IGA II



- PARALLEL SESSIONS C 1- 3  
(Wed., Oct. 18th, 4:45 - 6:00 pm)

Room VIII	"STANDER"	SDM II
Room IX	"WALKER"	WORKSHOP III

- PARALLEL SESSIONS D 1 - 3 (  
(Thurs., Oct. 19th, 08:30 am - 10:35 am)

Room I	"SWANSON"	BATTERY / ELECTRIC VEHICLE II
Room II	"SCHWEIZERHOF"	REDUCED ORDER MODEL

- PARALLEL SESSIONS D 4 - 6  
(Thurs., Oct. 19th, 08:30 am - 10:35 am)

Room V	"NILSSON"	MFG./ PROCESS SIMULATION
Room VI	"SHAPIRO"	MULTIPHYSICS I

- PARALLEL SESSIONS D 7 - 9  
(Thurs., Oct. 19th, 08:30 am - 10:35 am)

Room VIII	"STANDER"	WORKSHOP IV
Room IX	"WALKER"	WORKSHOP V

- PARALLEL SESSIONS E 1 - 3  
(Thurs., Oct. 19th, 11:15 am - 12:55 pm)

Room I	"SWANSON"	MACHINE LEARNING / AI I
Room II	"SCHWEIZERHOF"	BIOMECHANICS I

- PARALLEL SESSIONS E 4 - 6  
(Thurs., Oct. 19th, 11:15 am - 12:55 pm)

Room VII	"NILSSON"	PROCESS CHAIN
Room VIII	"SHAPIRO"	MULTIPHYSICS II

- PARALLEL SESSIONS E 7 - 9  
(Thurs., Oct. 19th, 11:15 am - 12:55 pm)

Room VIII	"STANDER"	WORKSHOP VI
Room IX	"WALKER"	WORKSHOP VII

- PARALLEL SESSIONS F 1 - 3  
(Thurs., Oct. 19th, 2 - 3.15 pm)

Room I	"SWANSON"	MACHINE LEARNING / AI II
Room II	"SCHWEIZERHOF"	BIOMECHANICS II

- PARALLEL SESSIONS F 4 - 6  
(Thurs., Oct. 19th, 2 - 3.15 pm)

Room V	"NILSSON"	SIMULATION MISC. II
Room III	"SHAPIRO"	CLOUD COMPUTING / HPC II



I'm AI and live on a small ranch on the outskirts of the town  
I use my parents, chatGPT for story assistance.  
**Investigate – Who placed the flour above a door?**

**The Rancher and Secretary had the agreement with pie as the payment.**

**It's time to investigate what happened with the flour? There may have been a wasted use of good pastry flour!**



**The Rhubarb Pie that caused a feud.**

**(See June how this all started!)**

Once upon a time, in the small town of FEANTM, there lived two almost friends named Old Rancher and The Secretary. They were known for their mischievous antics and playful banter that often led them to arguments that brought smiles to the faces of the townspeople.

One sunny morning, Old Rancher approached The Secretary with a mischievous glint in his eyes. "Hey, Secretary," he said, grinning. "How about we make a deal? If you help me decorate the town plaza with Xmas decorations, I'll bake you the most delicious Rhubarb pie you've ever tasted!"

The Secretary's eyes lit up with excitement. She loved Rhubarb pie and couldn't resist the temptation of Old Rancher's offer, even though it was only the month of June. Eagerly, she agreed to help him spruce up the town plaza with colorful Xmas lights and cheerful ornaments.

Every night for an entire week they snuck into the town park plaza. They worked side by side, quietly laughing and sharing stories as they transformed the town plaza into Xmas haven. The Secretary put her heart and soul into the decorations, all the while dreaming of the delectable pie that awaited her. Even if she got arrested by the Town Police Chief, Art, she could eat the pie in the town jail.

However, when the day came for Old Rancher to fulfill his promise, The Secretary found herself pie-less. She approached Old Rancher with a puzzled expression. "Old Rancher, where's my Rhubarb pie?"

Old Rancher's smile faded, and he shrugged nonchalantly. "Oh, Secretary, I was only kidding about the pie. You know how I love pulling pranks on you."

The Secretary felt a mix of disappointment and betrayal wash over her and then pure anger radiated through her entire body! Old Rancher's words hurt her deeply and now she wanted revenge. She couldn't believe he would break his promise after all the hard work they had put into sneaking at night to decorate the town plaza together.

Determined to get her sweet revenge, The Secretary hatched a plan. She decided to steal Old Rancher's precious recipe box, which he guarded with great secrecy. Late one night, The Secretary sneaked into Old Rancher's kitchen and tiptoed towards the counter, where the recipe box sat, innocently waiting. She was surprised he wasn't home and had left his door unlocked. She figured he must have fallen asleep in his barn, while doing late night chores.





**I'm AI and live on a small ranch on the outskirts of the town  
I use my parents chatGPT for story assistance.  
Investigate – Who placed the flour above a door?**

---

With trembling hands, The Secretary pocketed the box and made her way back home. The anticipation built as she carefully opened the box, expecting to find the long-lost recipe for the Rhubarb pie. However, instead of a recipe, she discovered a note neatly tucked inside.

"I knew you would steal my recipe box," the note read with a mischievous tone. "But before you go any further, look in your refrigerator!"

Baffled and intrigued, The Secretary hurriedly swung open her refrigerator door. And there it was, a freshly baked Rhubarb pie, resting on the shelf. She could hardly believe her eyes. Old Rancher had outsmarted her once again!

Touched by his thoughtfulness, yet still feeling a twinge of annoyance, The Secretary found another note beside the pie. " Secretary, Last week I stole the extra key to your house."

Realizing the seriousness of Old Rancher's retaliation, a mixture of amusement and exasperation took hold of her. She knew this meant war. The Secretary stormed out of her house, determined to confront Old Rancher and demand her house key back.

The once harmonious friendship between Old Rancher and The Secretary now teetered on the edge of chaos. Their banter had once again escalated into a full-blown feud. The townspeople watched with both amusement and concern as the two engaged in a battle of wits and pranks.

Days turned into weeks, and the war between Old Rancher and The Secretary raged on. Each day brought a new surprise, a new prank, and a new reason for the townspeople to chuckle. The friendly rivalry had transformed into a spectacle that entertained the entire town.

Finally, after an epic display of one-upmanship, Old Rancher and The Secretary stood face to face, out of breath and laughing uncontrollably. The absurdity of their feud dawned upon them, and they realized how their actions had brought joy and laughter to the town and not one laugh to them.

With a shared grin, they decided it was time to end the madness. Old Rancher handed The Secretary her house key, and The Secretary returned the recipe box, their prized possessions exchanged. From that day forward, they vowed to channel their mischievous nature into more productive and cooperative endeavors focused on doing things to the rest of the town.

And so, Old Rancher and The Secretary's friendship survived the chaos they had created, their bond stronger than ever. They became known as the mischievous duo of FEANTM, forever leaving a trail of laughter and memories in their wake. But, then one night The Secretary opened her house door and flour floated down coating her in the flour! She said it had to be the Old Rancher – And the feud started again! Art, our police chief could not find any finger prints and is not sure how it happened. As Police Chief he will decide to solve the flour mystery, or to ignore it – After all, it isn't like these two will stop anytime soon! The town all agreed that the only real crime was wasting good pastry flour!



**No one knows his name. You yell, "HEY, old racer."**

Stephan Winkelmann, Chairman and CEO at Automobili Lamborghini S.p.A., Lamborghini can't stop pushing boundaries. With that in mind, we can finally present our first hybrid racing prototype - Lamborghini SC63. This far-reaching project perfectly aligns with our Direzione Cor Tauri strategy, especially for a vehicle set to compete in both the Hypercar class of the 2024 FIA World Endurance Championship and in the GTP class of the IMSA WeatherTech SportsCar Championship. Let the adrenaline never stop flowing.



### [SC63: Lamborghini Unveils LMDh Prototype](#)

It's an exciting day for the Motorsport division of Automobili Lamborghini. Today, the Goodwood Festival of Speed was the thrilling backdrop for the unveiling of the SC63, Lamborghini Squadra Corse's first hybrid endurance racing prototype.

With the SC63, Lamborghini continues to go in the new direction of electrification and hybridization the brand has set for itself, applying this innovative challenge to the Motorsport program. Featuring an all-new 3.8-liter twin turbo V8 engine developed specifically for racing, a bodywork designed by Lamborghini Centro Stile in close collaboration with the race design team, and other innovative design and technology aspects, the SC63 is a jewel to be proud of.

"The SC63 is the most advanced racing car ever produced by Lamborghini," says Stephan Winkelmann, Lamborghini Chairman and CEO. "The opportunity to compete in some of the biggest endurance races in the world with a hybrid prototype fits with our vision for the future of high-performance mobility. The SC63 LMDh is the step into the highest echelon and into the future of motorsports for our Squadra Corse."

Lamborghini Chief Technical Officer Rouven Mohr adds: "Motorsport is, to us, a valuable and demanding proving ground for our technology. The SC63 is an exciting challenge from both a technical and a human standpoint. The development of our internal combustion engine, aerodynamically efficient bodywork, and the overall technical package is a process that has pushed us to constantly raise our own standards."

The future in store for the SC63 is, indeed, a challenging and exciting one. The vehicle is scheduled to compete in the Hypercar class of the 2024 FIA World Endurance Championship, including the 24 Hours of Le Mans, and in the GTP class of the IMSA WeatherTech Sports Car Championship Endurance Cup. Italian racing team Iron Lynx is the partner chosen by Lamborghini to lead the car in international competition.

"This year marks not only the 60th anniversary of our brand but also the 10th anniversary of Squadra Corse, Lamborghini's motorsport division," says Giorgio Sanna, Lamborghini's Head of Motorsport. "Over the last decade, we have achieved great results. Starting from scratch, we have won some of the most prestigious endurance races in the GT category for our production-based racing cars. These include three class wins at the 24 hours of Daytona and two wins in a row at the Sebring 12 hours. Now we are ready for what is our biggest step into the future of motorsport, measuring ourselves against the best manufacturers in the world."



[BMW Motorrad – 100 years of success.](#)

BMW Motorrad is celebrating its 100th anniversary. So, what better reason is there to take a nostalgic look back at the early days of an unprecedented success story – while at the same time opening up visions of a future where the role of motorbikes is increasingly being redefined in a digital world. Then as now, it's a story driven by passion, engineering and pioneering spirit.

**Visit the site for the complete information by year.**

"100 years of BMW Motorrad. What a success story! And it's the reason our jubilee year is peppered with a series of highlights: the anniversary exhibition 100 Years of BMW Motorrad at the BMW Museum in Munich, the BMW Motorrad Days, the inauguration of the BMW Motorradwelt in Berlin and, last but not least, a dazzling display of new models. Our success story is about to continue – with our passion, team spirit and innovativeness, always mindful of our tradition, but always with visions and solutions for the future." **Markus Schramm, Head of BMW Motorrad**

**1916 – 1920:** BMW – Aero engines and more. BMW was founded on 7 March 1916. That was the day the aero-engine manufacturer Gustav Otto became Bayerische Flugzeug Werke AG (BFW). One year later, in 1917, the Karl Rapp Motorenwerke was renamed Bayerische Motoren Werke GmbH (BMW) – which went public in 1918. BMW produced aero engines, supplied engines to other companies, and also manufactured train brakes at the time, and several years were to pass before it finally started manufacturing motorcycles of its own...



BMW Motorrad R 32



BMW Motorrad R 75/5

**2023:** 100 years of BMW Motorrad – The big show at the BMW Museum takes you on an exciting journey through the history of the brand. To coincide with 100 Years of BMW Motorrad, the great jubilee exhibition at the BMW Museum in Munich opened to the public on 12 May 2023. For the next year or so, visitors will be able to explore the 100-year history of BMW Motorrad as the world famous BMW Museum bowl honours BMW motorcycles by showcasing more than 55 originals from ten decades.





**[Boeing -T-7A Red Hawk First Flight from the Cockpit](#)** - On June 28, 2023, the T-7A Red Hawk took off in St. Louis, Missouri. During the 1 hour and 3 minute flight, U.S. Air Force Maj. Bryce Turner, 416th Test Squadron, and Steve Schmidt, Boeing T-7 chief test pilot, validated key aspects of the aircraft and demonstrated the power and agility of the Air Force's first advanced trainer to be digitally designed, built and tested. The aircraft is one of five EMD aircraft that will be delivered to the Air Force Air Education and Training Command for further testing.



**GD Land Systems- [Advanced Reconnaissance Vehicle: U.S. Marines' New Battlefield Quarterback](#)** – The General Dynamics Land Systems ARV connects to an array of onboard and offboard sensors, plus uncrewed aerial systems (UAS) and, in the future, ground robotic systems. Highly mobile on land and in the water, the ARV allows Marines to sense and communicate like never before on the multi-domain battlefield. The General Dynamics Land Systems design ensures growth margins and modular open architecture to rapidly incorporate new technology as it develops.



**BAYKAR - [The Goal: KIZILELMA Documentary | Chapter 2](#)** - In this documentary, retired soldiers, engineers and journalists who witnessed Baykar's high-tech development adventure tell the story and the process from their own perspective. Retired soldiers, including the former 2nd Chief of the General Staff, retired Admiral Ergin Saygun and retired Brigadier General Ömer Faruk Küçük, share testimonials of how their paths crossed with Bayraktar Family...



**AIRBUS Defense & Space - [Keeping it steady while flying supersonic](#)**

The Eurofighter Typhoon pilots and Air Wings have been keeping the skies above the NATO summit in Vilnius, Lithuania, safe and secure.





# Town Airport Quiz

July

The quiz - was left in the suggestion box by The Old Retired Pilot.

No one in town knows his name. You yell, "HEY, Old Pilot."

Answers are on the goodbye page. (last page)

Hint for D – silent flight – hearing enhanced – stealth optimized – camouflage expertise!



A \_\_\_\_\_



B \_\_\_\_\_



C \_\_\_\_\_



D \_\_\_\_\_



[Courtesy of and Copyright to USAF Photo](#)

### US Airforce Red, White & Blue



**U.S. Air Force Maj. Michael Bakke** from the 621st Mobility Support Operations Squadron, Joint Base McGuire-Dix-Lakehurst, N.J., prepares as a Japanese C-130 Hercules lands on Baker Landing Zone in Tinian, U.S. Commonwealth of the Northern Marianas... The 621st Mobility Support Operations Squadron members, Air Mobility Liaison Officers, Expeditionary Air Ground Liaison Element members, and Japanese loadmasters participated in exercise Mobility Guardian 23

**U.S. Air Force photo by Airman 1st Class Kadielle**



**Banking hours** - Maj. Kristin Wolfe, F-35A Lightning II Demonstration Team commander, flies an F-35 assigned to the 421st Fighter Generation Squadron during a practice performance at Hill Air Force Base, Utah, July 12, 2023. Military members and key spouses with the 388th Fighter Wing were invited to observe the practice performance on the flight line and interact with the crew members assigned to the demonstration team.

**(U.S. Air Force photo by Staff Sgt. Kaitlyn Ergish)**



**Interception** - A U.S. Air Force F-15C Eagle intercepts two B-1B Lancer bombers as they entered an Air Defense Identification Zone off the east coast of North America during air-defense Operation Noble Defender, June 26, 2023. Aircraft from the Canadian NORAD Region and Continental U.S. NORAD Region executed maneuvers designed to defend the eastern approach of North America from simulated cruise missile threats in this operation.

**(U.S. Air National Guard photo by Master Sgt. Bryan Hoover)**



MeDiTATe project: **Marta Bracco Early Stage Researcher 13**

A new paper “Fast strain mapping in abdominal aortic aneurysm wall reveals heterogeneous patterns” has been published in the Frontiers in physiology Journal.

The paper was written by Marta Bracco (ESR 13) as well as by authors from the MeDiTATe project including Marco Evangelos Biancolini, Principal Investigator of the MeDiTATe project, Stéphane Avril, Research Coordinator of MeDiTATe project and Laurence Rouet (Philips) Industrial Supervisor of the ESR 13.



Excerpt [“Fast strain mapping in abdominal aortic aneurysm wall reveals heterogeneous patterns”](#)

(A) 2D US cine-loop sequence acquired from an AAA patient

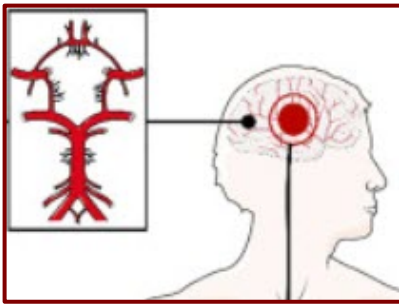
**The abstract is as follows:**

Abdominal aortic aneurysm patients are regularly monitored to assess aneurysm development and risk of rupture. A preventive surgical procedure is recommended when the maximum aortic antero-posterior diameter, periodically assessed on two-dimensional abdominal ultrasound scans, reaches 5.5 mm. Although the maximum diameter criterion has limited ability to predict aneurysm rupture, no clinically relevant tool that could complement the current guidelines has emerged so far. In vivo cyclic strains in the aneurysm wall are related to the wall response to blood pressure pulse, and therefore, they can be linked to wall mechanical properties, which in turn contribute to determining the risk of rupture. This work aimed to enable biomechanical estimations in the aneurysm wall by providing a fast and semi-automatic method to post-process dynamic clinical ultrasound sequences and by mapping the cross-sectional strains on the B-mode image. Specifically, the Sparse Demons algorithm was employed to track the wall motion throughout multiple cardiac cycles. Then, the cyclic strains were mapped by means of radial basis function interpolation and differentiation. We applied our method to two-dimensional sequences from eight patients. The automatic part of the analysis took under 1.5 min per cardiac cycle. The tracking method was validated against simulated ultrasound sequences, and a maximum root mean square error of 0.22 mm was found. The strain was calculated both with our method and with the established finite-element method, and a very good agreement was found, with mean differences of one order of magnitude smaller than the image spatial resolution. Most patients exhibited a strain pattern that suggests interaction with the spine. To conclude, our method is a promising tool for investigating abdominal aortic aneurysm wall biomechanics as it can provide a fast and accurate measurement of the cyclic wall strains from clinical ultrasound sequences.



MeDiTATe project: **Beatrice Bisighini - Early Stage Researcher 03**

A new paper “Patient-specific computational modelling of endovascular treatment for intracranial aneurysms” has been published in the Brain Multiphysics Journal..



**Highlights** [“Patient-specific computational modelling of endovascular treatment for intracranial aneurysms”](#)

The paper was written by Beatrice Bisighini (ESR 03) as well as by other authors including: Stéphane Avril, Research Coordinator of MeDiTATe project and PhD Supervisor of Beatrice Bisighini.

**Highlights from the paper:**

- State-of-the-art analysis of numerical modelling of the endovascular treatment of cerebral aneurysms, emphasizing the accuracy and efficiency aspects of the different techniques present in literature.
- Evaluation of how these scientific tools and discoveries can assist practitioners in the pre and intraoperative stages predicting the intervention outcomes.
- Discussion of challenges related to endovascular treatment modelling that require further study.

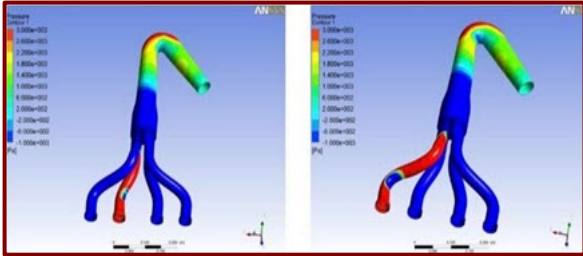
**Abstract** - Endovascular techniques, such as endoluminal or endosaccular reconstruction, have emerged as the preferred method for treating both ruptured and unruptured intracranial aneurysms, replacing open surgery in most cases. The minimally invasive approach has been shown to result in better surgical outcomes and lower mortality rates. Before the procedure, neuroradiologists rely only on their experience and visual aids from medical imaging techniques to select the appropriate endovascular option, device model and size for each patient. Despite the benefits of endovascular techniques, significant complications can arise during and after the procedures, including intraprocedural aneurysm perforation, delayed rupture, aneurysm regrowth, in-stent restenosis and thromboembolic events. Therefore, predictive virtual replicas of these interventions can serve as a valuable tool to assist neuroradiologists in the decision-making process and optimise treatment success, especially in cases involving complex geometries. Computational modelling can enable the simulation of different treatment strategies considering the most clinically relevant short- and long-term outcomes of the deployment and the postoperative complications that may arise over time.

**Statement of significance:** This review explores the state of the art in modelling the mechanics of the main neurovascular devices, their deployment within patient-specific geometries, their interaction with the vessel wall and their influence on the local hemodynamics. As it strongly affects their applicability in clinical practice, particular attention is paid to the computational accuracy and efficiency of the different modelling strategies. The aim is to evaluate how these scientific tools and discoveries can support practitioners in making informed decisions and highlight the challenges that require further study.





**This work is dated 2011 by an engineering student at University of Rome "Tor Vergata" that used RBF Morph software.** The thesis focuses on the parametric analysis of a manifold exhaust system for a four-cylinder internal combustion engine using a model provided by Ansys UK.



University of Rome Tor Vergata | 2011 The presentation is in Italian - the thesis in English.

[Fluid dynamics of exhaust manifolds for internal combustion engines](#). Analysis and optimization of geometry through a numerical approach based on a mesh morphing algorithm. **Author: W.Savastano**

The goal was to optimize the pressure drops between the inlet and outlet. Different geometric configurations were proposed and analyzed to address turbulence and vorticity issues. RBF Morph solutions were developed for each pipe and integrated within the Fluent framework to optimize the geometry efficiently. A total of 224 fluid-dynamics simulations were performed thanks to an automated workflow. The results showed that the proposed configurations eliminated pressure drop differences in symmetrical pipes and reduced differences by 70% in non-symmetrical pipes.

**Abstract** - This thesis deals with a numerical parametric investigation aiming to optimize the Fluid-dynamic performance of a manifold exhaust system for combustion engine.

Geometry and mesh have been directly provided by Ansys Italy and they refer to a four-cylinder internal combustion engine. The model, generated and analyzed by Ansys to simulate fluid-dynamics of internal flows, need to be tweaked.

Obviously in an exhaust system there are many parameters to consider; in our case, particular attention was placed on pressure drops among four engine exhaust valves and the outlet.

Specifically, it is need to prevent formation of turbulent areas. First thing to do is run a check on the baseline. If the pressure drops across different ducts turns out to be different, this difference will be reduced as much as possible, trying to delete it altogether.

Following the baseline analysis, the changes necessary to apply to the geometry will be identified. The analysis will be performed by Fluent, a commercial CFD core solver. Moreover, changes and optimization of the geometry will be developed through the RBF-morph tool.

This software allows to significantly speed up calculation times. This is because normally, following a usual fluid dynamics simulation wherein changes to geometry are needed, other numerical external packages have to be employed, able to match, via an iterative data exchange process, with the CFD core solver.

With RBF-morph it is possible to create modifications and to wide these, even negatively, and setting output parameters (in our case the pressure differences). Moreover, it is possible to control the entire process from the Workbench platform; noting how the output parameter changes, depending on the amplification of morph solutions. Finally, numerical simulations will give indications on the values of the available parameters that allow to obtain an optimal geometry.



**FEANTM: What you need to see, if you didn't see it. This month I will shine a spotlight on an ANSYS Innovation Course Basics of Turbulent flows**, an exceptional opportunity for educators, students, and engineers to delve into online physics and a perfect engineering course. These courses are specifically crafted to augment simulation and physics learning.

**A remarkable aspect I found is that ANSYS offers them free of charge.**

It's crucial not to miss this valuable resource on their website.



**Basics of Turbulent Flows** - In this course, some fundamental aspects of turbulence will be discussed. The concept of laminar-turbulent transition is first introduced, followed by a detailed discussion on what constitutes turbulence. A theoretical framework, including governing equations, to understand turbulent flows is then presented, followed by a discussion on the closure problem and how to deal with it.

- Lesson 1 - Introduction
- Lesson 2 - Stability of Laminar Flows & Transition to Turbulence
- Lesson 3 - Description of Turbulence
- Lesson 4 - Governing Equations of Turbulent Flows
- Lesson 5 - Closure of RANS Equations
- Lesson 6 - Turbulent Boundary Layers

**Simulation Examples, Homework, & Quizzes**

- Wind Flow Between Two Buildings - Simulation Example
- Kelvin-Helmholtz Instability Between Two Fluids - Simulation Example
- Turbulent Flow Over a Flat Plate - Homework
- Transition on Flat Plate - Homework
- Quiz - Basics of Turbulent Flows

**Summary & Post Completion Survey**

**Meet the Instructors**



**Rahul Kumar**

Ph.D in Aerospace Engineering  
Univ. of Cincinnati



**Weiyu Cao**

Ph.D in Mechanical Engineering  
University of Michigan



**Kalyan Goparaju**

Ph.D in Aerospace Engineering  
Ohio State University



**Pankaj Rajput**

Ph.D in Mechanical Engineering  
New York University



The Old Cattle Rancher's Ranch

No one knows his name.  
You yell, "HEY, old rancher."

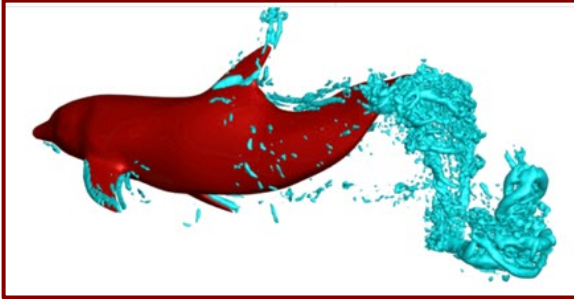
**Agriculture, Animals, Soil, Equipment, Cattle,  
and whatever he wants.**

Right Picture – My dog, Scout, & my horse, Cowboy

August



Thanks to Yury Novozhilov, for liking the following post by Pan Hanon on social media



**Thrust generation and propulsive efficiency in dolphin-like swimming propulsion**

**J. Guo, W. Zhang, P. Han, F.E. Fish & H. Dong**

Dorsoventral undulation, a propulsion technique widely employed by aquatic mammals, plays a significant role in their swimming abilities.

Among these skilled swimmers, dolphins are particularly renowned for their high-efficiency cruising capabilities. In fact, the common dolphin (*Delphinus delphis*) can reach speed of up to 37mph. Led by FSRG group at University of Virginia, we recently published a work in *Bioinspiration & Biomimetics* delves into the force generation mechanisms behind dorsoventral swimming, providing valuable insights for future designs of unmanned underwater vehicles.

**Abstract:** Given growing interest in emulating dolphin morphology and kinematics to design high-performance underwater vehicles, the current research effort is dedicated to studying the hydrodynamics of dolphin-like oscillatory kinematics in forward propulsion. A computational fluid dynamics (CFD) method is used. A realistic 3-dimensional (3-D) surface model of a dolphin is made with swimming kinematics reconstructed from video recording. The oscillation of the dolphin is found to enhance the attachment of the boundary layer to the posterior body, which then leads to body drag reduction. The flapping motion of the flukes is found to generate high thrust forces in both the downstroke and the upstroke, during which vortex rings are shed to produce strong thrust jets. The downstroke jets are found to be on average stronger than the upstroke jet, which then leads to net positive lift production. The flexion of the peduncle and flukes is found to be a crucial feature of dolphin-like swimming kinematics. Dolphin-inspired swimming kinematics were created by varying the flexion angle of the peduncle and flukes, which then resulted in significant performance variation. The thrust benefits and propulsive efficiency benefits are associated with a slight decrease and slight increase of the flexion of the peduncle and flukes, respectively.



**FSRG group at University of Virginia** ..., the Dong Research Group, which was started in 2006 by Dr. Haibo Dong, is of fundamental interests in understanding the physics of complex flows of flying and swimming in nature by combining state-of-the-art computational methods, experimental tools, and theoretical fluid dynamics

Research is driven by the quests to answer questions both from fundamental fluid dynamics problems and from practical applications. or studying unsteady vortex-dominated flow problems.

**For complete information and graphics visit their website**





Thank you for joining me on my visit to this museum.  
AND, don't forget to join me next issue when I visit another museum!

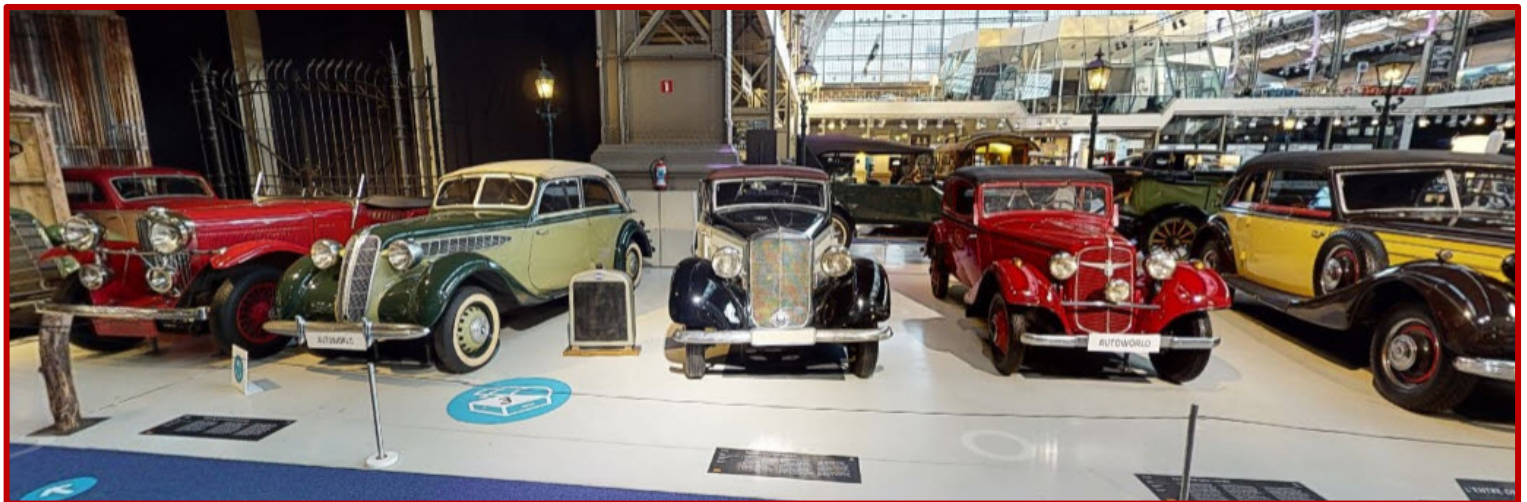


[AUTOWORLD Virtual Tour](#)

Website, “Curious to visit Autoworld? Thanks to our virtual tour you can take a look inside the treasury of the automobile history from behind your computer! Please beware that the virtual visit is not live and can therefore differ from reality: the museum continuously evolves and the presented expositions and vehicles change regularly.”



Website, “Mahy, a family of cars. The barnfind collection. Few people will recall this, but Autoworld was founded at the time to house part of the Mahy collection. This internationally renowned collection, which retraces the incredible Belgian history of the automobile, includes near on one thousand vehicles! Exclusively for Autoworld, about thirty very special cars will come out of the "Mahy Reserve" this summer. Most of them are unique pieces that will be exhibited "dans leur jus"







My Crossword Puzzle

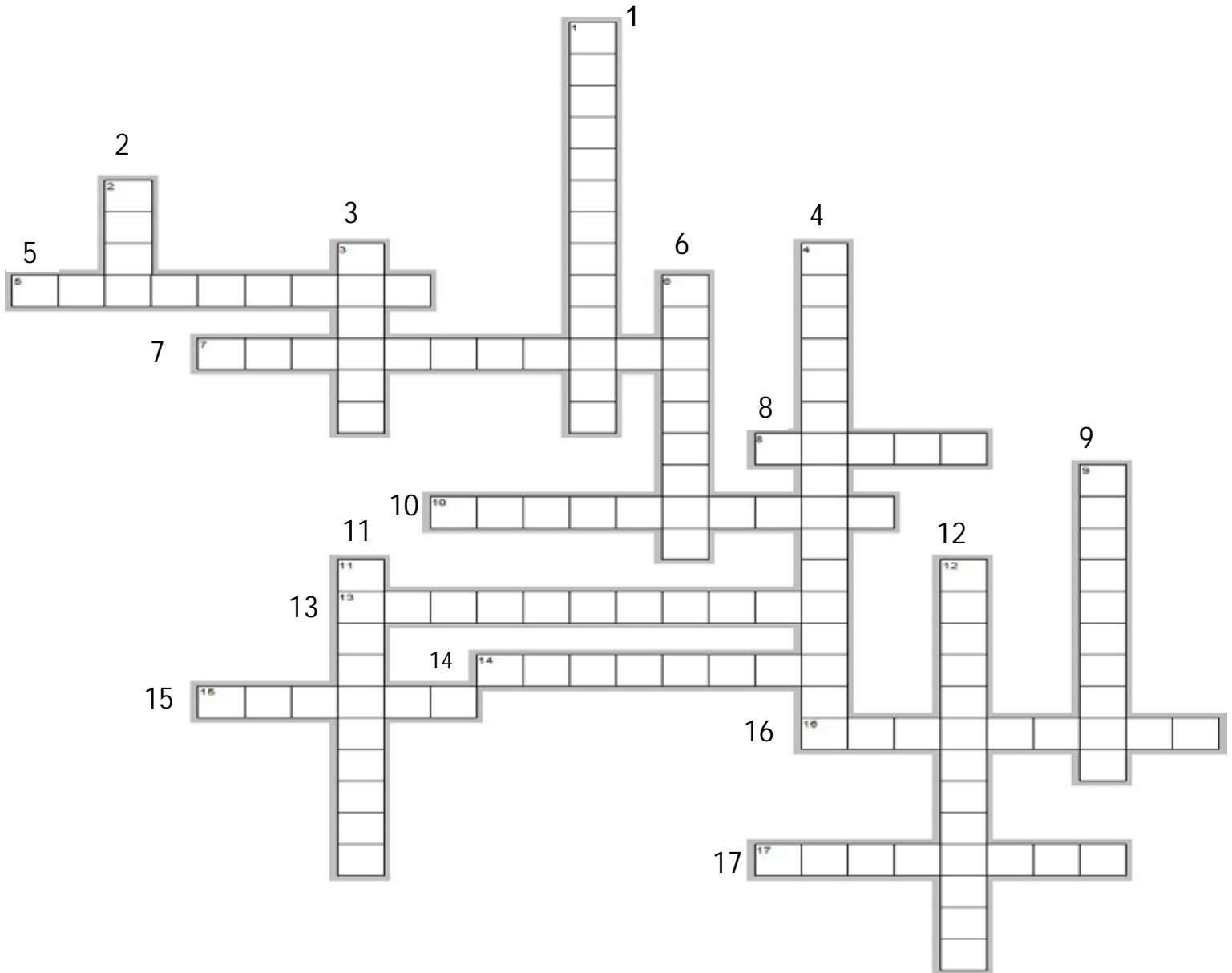
Answers on next page BUT don't cheat and look!

Across

- 5. 3D Product Simulation Software
- 7. Create and Deploy Digital Twin Models
- 8. optical system design
- 10. 3DCADModeling
- 13. Cloud-based Simulation Service
- 14. Electromechanical Design
- 15. fluid simulation
- 16. Process Integration & Design Opt software
- 17. Predict electronic reliability

Down

- 1. Simulation for Photonic Components
- 2. 3D High Frequency Simulation Software
- 3. Material properties Database
- 4. Optical Design and Analysis
- 6. Simulation Integration Platform
- 9. StructuralFEA Analysis
- 11. Suite for model-based design
- 12. Safety-critical electronic system analysis

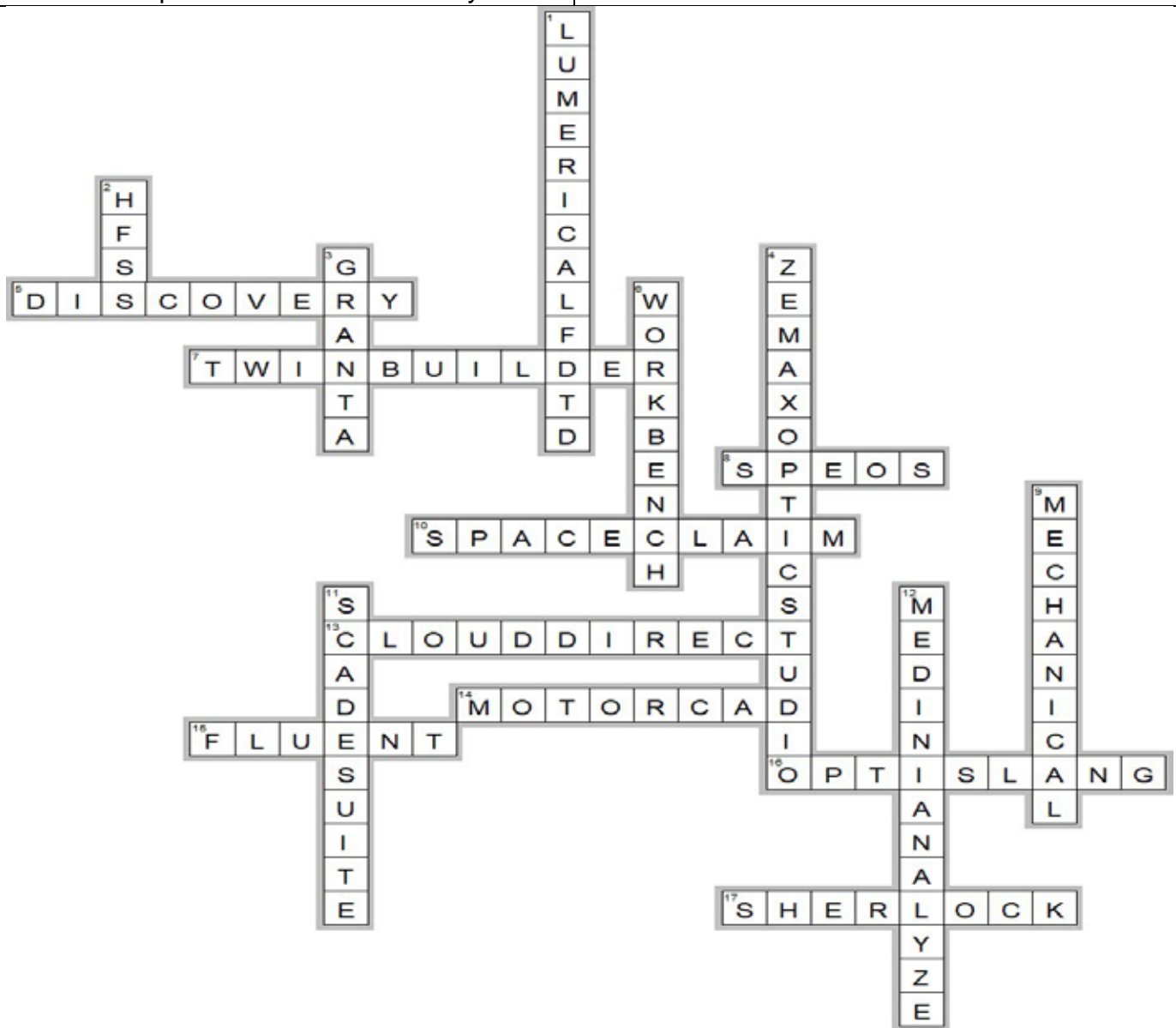




Town secretary  
**My Crossword Puzzle**  
**Answers**

August

Across	Down
5. <b>DISCOVERY</b> —3D Product Simulation Software	1. <b>LUMERICALFDTD</b> —Simulation for Photonic Components
7. <b>TWINBUILDER</b> —Create and Deploy Digital Twin Models	2. <b>HFSS</b> —3D High Frequency Simulation Software
8. <b>SPEOS</b> —optical system design	3. <b>GRANTA</b> —Material properties Database
10. <b>SPACECLAIM</b> —3DCADModeling	4. <b>ZEMAXOPTICSTUDIO</b> —Optical Design and Analysis
13. <b>CLOUDDIRECT</b> —Cloud-based Simulation Service	6. <b>WORKBENCH</b> —Simulation Integration Platform
14. <b>MOTORCAD</b> —Electromechanical Design	9. <b>MECHANICAL</b> —StructuralFEA Analysis
15. <b>FLUENT</b> —fluid simulation	11. <b>SCADESUITE</b> —Suite for model-based design
16. <b>OPTISLANG</b> —Process Integration & Design Opt software	12. <b>MEDIANALYZE</b> —Safety-critical electronic system analysis
17. <b>SHERLOCK</b> —predict electronic reliability	





I must live on squirrel ranch! I have so many pictures of them I don't even take anymore pictures. AND this month is final squirrel month to share the final pictures.





Goodbye and Come Back Soon



**QUIZ**

A- 10C Thunderbolt II

B - B-1 Lancer

C - F-16 Fighting Falcon

D - Our Ranch Owl – how many of you guessed that it was an Owl?



We will always remember.  
They will never be forgotten.

Our Town Salutes our US military,  
NATO and Friends of the US & NATO.

We salute freedom

- First Responders, Police,
- Fire Fighters
- EMT's, Doctors, Nurses, ALL!

We salute engineers, scientists, and  
developers, because without them  
we would not have technology.