



Monthly Town Hall Meeting
Engineering, Blog, Gossip & News
www.feantm.com

Aerospace



Aerospace



Automotive



Automotive



Library



Museum



Research - Federica



Charlotte



Garrett



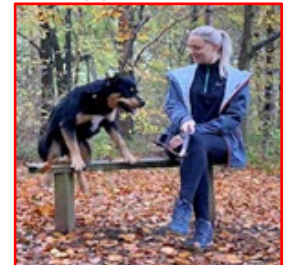
Jeremy



Kathleen



Seppi & Marta



Metin



Rasmus



Tim



FEA not to miss a/k/a (FEANTM) comprises a group of interested parties sharing information. Information is presented on the website www.feantm.com and this publication ISSN # 2694-4707.

Goal

We believe in our effort to advance knowledge. Our goal is to share information on companies with expertise and innovative products. We believe this constitutes a "fair use" of the material under Title 17 USC. Section 107."

ALL information contained herein is for informational purposes only. Use of the information does NOT constitute that the product company endorses nor owns any part of FEA Not To Miss. **Copyright is retained solely by the product's respective company, and links are provided to that company.**

Compensation

FEANTM does NOT receive compensation from the companies whose products we showcase. Companies and information included is at the sole discretion of FEA not to miss a/k/a FEANTM.

DISCLAIMER

"**FEANTM** is not responsible for any errors or omissions or for the results obtained from the use of this information.

FEANTM contains links to other Web Sites ("Linked Sites"). The Linked Sites are not under the control of FEANTM and FEANTM is not responsible for the contents of any Linked Site, including without limitation any link contained in a Linked Site, or any changes or updates to a Linked Site.

All information in this publication and on the feantm.com website is provided "as is" with no guarantee of completeness, accuracy, timeliness, or the results obtained from using this information from the company websites.

Opt-Out

Any company may opt-out at any time by writing to Marsha feaanswer@aol.com

After that, going forward from the email's receipt, content (excluding that found on Twitter, LinkedIn, YouTube, FaceBook and other social media) will not be included.

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

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

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

Table of contents All postings &/or articles are copyright to the respective person/company

- The websites noted will have the complete articles, and higher resolution graphics/videos.
- We reference and link to the source of information.
- This blog/magazine/town is a positive venue for informational purposes.

05 Town Hall Meeting & Announcements

06 Town Map

May 2023 - Name listed is the person the town thanks.

The above doesn't mean they are the author, OR in a specific department.

Town Hall Meeting Rooms (A)

07	Charlotte	Fill in the poll for our next half-day of information on June 15.
08	Garrett	Simulation and Modeling in Product Development and Innovation
09	Jeremy	Researchers develop method for real-time defect detection in metal 3D-printed parts
10	Kathleen	The DigiTain (Digitization for Sustainability) research project.
12	Markus	Training Course CFD Simulations with Ansys Fluent
13	Marta	New Release - Suite 20.0 LS-DYNA PRE & POST processing software.
15	Metin	CFD Applied to Separation Processes: The Cyclone (Part 1)
16	Nicola	Calibration of the Johnson-Cook plasticity for high strain rate regime applications
17	Rasmus	Case study: From CAD to a fully functional virtual prototype
18	Shweta	Simulated annealing
19	Tarik	Control systems
20	Tim	HxGN LIVE Global 2023 - 12-15 June in Las Vegas, NV

Town Hall Poster Board & Guest Room (G)

21	Posters	FEANTM Editor	LURI Engineering - AES - OmniQuest – VARROC – UFI Filters
22	Guest	A. Tanksale	My top 5 Reasons Why Car Manufacturers Outsource
23	YouTube	Exhibitors	This month: Rescale - DYNAmore - Ozen - OASYS
24	EVENTS	Hans & RheKen	Global Event Dates Not To Miss

Automotive and/or Racing Information

25	Hardik	What is Automotive NVH?
27	Mercedes-Benz	The latest generation of brake control systems for future electric platforms in winter testing at the Arctic Circle

Thanks to [Vecteezy](#) for our **Map Vector/town** and many of the graphics in our magazine

Table of contents All postings are copyright to the respective person or company

First named person the town thanks

The above doesn't mean they are the author, OR in a specific department.

Airport – Aerospace - Military

28	Bell Boeing	22 Fast Facts on the Bell Boeing V-22 Osprey
29	GE - TAI	Maintenance, repair and overhaul of LM2500 marine gas turbines
30	O.R Pilot Quiz	Name that Helicopter!
31	News & Air Force	USAF - Pictures of the month

Research Hospital

32	M. Biancolini	Federica Galbiati - Mediate Project HPC+ in the medical field: Overview and current examples
33	FEANTM Staff	AVICENNA DAYS & THE AVICENNA ALLIANCE
34	FEANTM Staff	Kaiser Permanente - Barriers and Opportunities Regarding Implementation of a Machine Learning-Based Acute Heart Failure Risk Stratification Tool in the Emergency Department

AI – ML – Data Science Building – Closed for Renovations

Town Library – papers or learning (first author)

35	Course	A. Fountain - New minor aims to meet need for SC forensic scientists
----	---------------	----------------------------------------------------------------------

Cattle Rancher – Whatever he wants

36	RBF Morph	Video Game - Morphing wings for a videogame
----	------------------	---------------------------------------------

Secretary – Virtual Tours

37	Museum	The MAUTO – Museo dell'Automobile of Turin
38	Puzzles	LAST Cross Word Puzzle – History questions & Name that ANSYS Product

Supervisor – Town Coffee Shop & Anything, never sure what will show up!

40	RheKen	Why are milking cows wearing pink bows?
12	Secretary	Answers to Cross Word Puzzle

Goodbye Page

This blog/magazine is a positive venue, for informational purposes, and not revenue

**TOWN HALL MEETING
FREE COFFEE**

Park Cars behind building

Tie horses to hitching rails

Serving coffee & Runeberg torte

Our town comprises individuals interested in solutions and, of course, animals and children.

Gossip is at the local coffee shop.

Pets are welcome. (Horses stay outside)
(Pet goats & pet pigs also stay outside)



The town welcomes FINLAND to NATO. Finland's flag was raised alongside those of the 30 other nations in the alliance during a ceremony at NATO headquarters in Brussels. Of course, our town supervisor welcomes the new pastries from Finland and the Karl Fazer Milk Chocolates.

Welcome to our town hall meeting for May and we have two new town residents:

Garrett from Rescale US - Rescale is a cloud-based platform for computational engineering, and R&D. Garrett will assist our town with the trends in HPC + AI + cloud and how these trends are converging to redefine R&D.

Hans from DYNAmore Germany. While visiting our town and working remotely, Hans will co-host the monthly events page with RheKen. As you all know, Hans is a Human Body Model, and RheKen is the town AI reporter. Yes, I agree that's an odd collaboration. I wasn't involved in their discussions. They were the only two involved in the discussions. Additionally, they were the only two that knew about the vote and the only two that voted - it was unanimous.



Project

DigiTain development of new approaches in the spatial discretization of the FEM & homogenized, data-driven constitutive models.



Educational

eLearning adds even more flexibility to CADFEM training. Decide for yourself when, where, and how often you undertake Ansys training.



Version Release

Suite 20.0, LS-DYNA PRE & POST processing software. The tools to power through your LS-DYNA workflow. Our applications support all its latest features



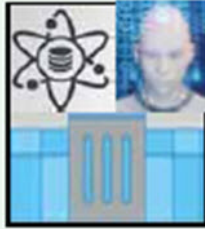
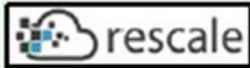
Medical

The publication in collaboration between BioCardioLab FTGM and our Federica Galbiati ESR 07 of the MeDiTATe-project. "HPC+ in the medical field: Overview & current examples"

Town Map



Horse Trail →



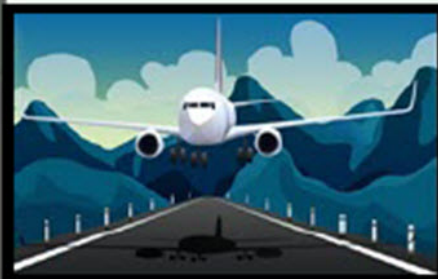
Auto Race track & Auto Industry



Petting Zoo



Old Rancher



Rival Cafe

Elect/Water. & Sewage Treatment Plant Facilities

- * The logos displayed, of content in our magazine, do not represent their endorsement.
- * To be removed, please notify feaanswer@aol.com with the request.
- * Your town lot will be auctioned, with the Town applying all proceeds to the coffee budget.
- * The town map changes pending information, and rotational building rentals.



Our next half-day of information will be in June 15.
Help us choosing the topic by filling in the poll:
<https://forms.gle/j5bBbqCVioPgmqTV7>



DYNAmore France

The 2023 French events and courses are available on our website.

You will find all our French training courses. Online webinars as well as on site courses in our premises in Versailles are proposed.

Free information webinars are also offered on specific topics related to customer needs.

Our 3rd French LS-DYNA User Day will occur.

Our full seminar brochure -download at: <https://www.dynamore.eu/en/homepage-news/eu/brochure-2023>

Evènement / Formation	Avril	Mai	Juin	Juillet
Introduction à LS-DYNA		10-12		03-05 (compacte*)
Introduction à LS-PrePost				
Introduction aux technologies de la simulation		23		
L'analyse implicite avec LS-DYNA			12-13 (compacte*)	
Contacts dans LS-DYNA				
Mise en forme à froid avec LS-DYNA	12-14			
Modélisation des matériaux métalliques				
Introduction et optimisation avec LS-OPT			21-23	
Introduction et identification de paramètres avec LS-OPT	04			
La méthode ALE et le couplage fluide-structure dans LS-DYNA			26-27	
La méthode SPH (Smoothed Particle Hydrodynamics) dans LS-DYNA			28-29	
Demi-journée d'Information			15	
3ème Journée Utilisateurs LS-DYNA France				

Toutes les formations ont lieu dans nos bureaux à Versailles.

*Formation en ligne



RESCALE - Modeling and simulation is the exploration of the complexities of the physical world, virtually. Often used together with high performance computing (HPC) techniques, these technologies are vital tools in engineering, science, and product development.

Simulation and modeling software plays a major role across many industries to solve complex problems. Many concepts benefit from mathematical exploration, rather than visual or intuitive approaches.



Excerpt - [Simulation and Modeling in Product Development and Innovation](#)

From 2023 to 2030, the global simulation software market is expected to expand at a compounded annual rate of 13.6%, according to market analysis. Today, simulation and modeling powered by cloud HPC and supercharged by AI/ML delivers more advanced capabilities with greater efficiency for engineers, scientists, and researchers

The Foundations of Modeling and Simulation - Often referred to as M&S or MODSIM, “simulation” and “modeling” take on varied meanings in different contexts. The usage of the terms often overlaps, and sometimes the terms are even used interchangeably. While modeling and simulation do go hand-in-hand, there is a distinction between the terms. Modeling is the physical or logical representation of a system that helps make decisions or predictions about that system. A simulation uses modeling to imitate a real experience, thing, or process.

Simulations drive innovation in many sectors, from aerospace and automotive to earth and life sciences. In semiconductors and electronic design automation (EDA), simulations verify designs and guide new chip layouts. In manufacturing, simulations help with materials testing and factory optimization. Model-based engineering also supports various design and operating decisions for process development and optimization.

Visualization of code-based and numerical models is an important part of simulation and modeling, from model building and simulation preparation to testing and production simulation. For example, popular tools like Paraview and NiceDCV visualize (render) complex simulation outputs like structural mechanics, fluid dynamics, and architectural modeling.

In practical application, computer-aided engineering (CAE) uses simulations to advance product development and allows for testing very early in the process. This reduces the need for actual representations or prototypes, making the journey from concept to design to production quicker and more effective than ever before...

Continue the above for the complete article on the website including the following:

- Discrete Event Simulation, Continuous Simulation
- Agent-Based Modeling, System Dynamics Modeling,
- Simulation and Modeling: A Recap - The Future of Modeling and Simulation: The Era of AI



LLNL - Lawrence Livermore National Laboratory (LLNL) engineers and scientists have developed a method for detecting and predicting strut defects in 3D-printed metal lattice structures during a print through a combination of monitoring, imaging techniques and multi-physics simulations.

[LLNL researchers develop method for real-time defect detection in metal 3D-printed parts](#) - Author: Jeremy Thomas



The high-strength and low-density properties of metallic lattices have found applications in many fields. During the process of laser powder bed fusion (LPBF) 3D printing, missing struts and defects can occur that affect the mechanical behavior of the printed lattice. To ensure quality, researchers said, scientists typically perform a post-build inspection, which takes time and is not always possible, especially with complex builds. To address this issue, an LLNL team has investigated the ability

to monitor build quality in situ to decide, on-the-fly, if the part will satisfy quality requirements.

As described in a paper recently published in Additive Manufacturing Letters, LLNL researchers monitored the printing of a metallic micro-lattice structure using a photodiode, a pyrometer — both of which measure light emitted from the melt pool — and thermal imaging. The team printed normal struts and intentionally defective “half-struts” through the LPBF process, measuring the thermal emissions from the melt pool. The researchers then developed a method to use those thermal emissions to predict defects with high accuracy.

“For the first time, this quality-control process was studied in metallic lattices and we developed a methodology to detect defective struts with a missing bottom part,” said lead author and LLNL staff scientist Jean-Baptiste Forien. “At the moment, we are capable of detecting defects that span multiple layers, but in the future, new methods will be developed to identify defects within a printed layer. This will allow a dynamic reaction and potentially the suppression of the defect before resuming printing of the rest of the build.”

The team developed their defect detection/prediction method based on observations from the test prints, high speed imaging and multi-physics simulations of the LPBF melt pool. By monitoring thermal emission, researchers could predict whether a strut was present or missing with accuracy of more than 94%, validating the mechanisms behind the observed thermal emissions through high-speed thermal and optical imaging, and simulations using the ALE3D multi-physics code.

The researchers said the approach provides “valuable insights” into part quality and reflects the potential of melt pool thermal emission monitoring for identifying defects in LPBF parts.

Co-authors included LLNL scientists and engineers Gabe Guss, Saad Khairallah, William Smith, Philip DePond, Manyalibo “Ibo” Matthews and principal investigator Nick Calta.



DYNAMORE - The DigiTain (Digitization for Sustainability) research project

DYNAmore, an Ansys Company, is responsible in DigiTain for a central work package targeting development of new approaches in the spatial discretization of the Finite Element Method and homogenized, data-driven constitutive models, with **the aim to implement these into the simulation suite LS-DYNA.**



The DigiTain (Digitization for Sustainability) research project for fully digital product development of sustainable electric drive architectures is picking up speed.

The DigiTain (Digitization for Sustainability) research project consists of 26 funded and 2 associated partners from industry and academia. The project started on Jan. 1, 2023, with a total project duration of 36 months



In DigiTain, processes, methods and models for fully digital product development and certification of sustainable electric drive architectures are being developed and tested using a physical technology platform. The project is funded by the German government as well as the European Union as part of the economic stimulus package, KoPa 35c within module b: New, innovative products as the key to vehicles and mobility of the future.

Stefan Heidemann from the Federal Ministry for Economic Affairs and Climate Action (BMWK)

“In particular, the holistic approach, which integrates several technological innovations at once, the cross-value-added networking of the partners and their specialist expertise, as well as the associated transfer potential to industry and society, make DigiTain a lighthouse project of our specialist program”, says.

The project sponsorship for DigiTain was assigned to the TÜV Rheinland Consulting GmbH.

A detailed description of DigiTain - Ecologically and economically sustainable criteria in vehicle and drive architecture development are becoming increasingly relevant in politics, society, and industry. The technical-economic criteria of classical product development and subsequent optimization with an ecological product evaluation only in the late phase of product development are therefore no longer sufficient and up to date.

The sustainability assessment during the product development process currently confronts developers with major challenges. Suitable digital processes, methods, and tools for the ecological optimization of the entire vehicle, including the propulsion components, are not available. In addition, there is a lack of binding standards for fully digital product development and evaluation, which means that many experimental validation tests are still required for certification.



DYNAmore, an Ansys Company, is responsible in DigiTain for a central work package targeting development of new approaches in the spatial discretization of the Finite Element Method and homogenized, data-driven constitutive models, with the aim to implement these into the simulation suite LS-DYNA.

In cooperation with partners from the University of Stuttgart, improved element formulations of shell and solid elements for classical Finite Element Technology are being developed. This need results from changed requirements for structural load transfer in crashworthiness applications due to modified packaging of the upcoming, new propulsion technologies. On the other hand, **the new technology of isogeometric analysis, in which LS-DYNA is considered the market leader and technology driver, will be further developed in cooperation with the partners BMW and Mercedes-Benz.** Final goal will be productive application in full vehicle models.

Together with specialists from the University of Stuttgart and the participating Fraunhofer Institutes, DYNAmore is developing homogenized, data-driven and scale-bridging constitutive models to push the current limits of prediction quality in crash simulation for finely meshed vehicle components. The developments mentioned above will be advanced collaboratively with the partners towards applications on component level and finally deployed to a physical technology platform. And last but not least, DYNAmore is intensively involved in the development of a modelling catalogue that shall become the first step into the standardization and eventually certification of simulation models.

Professor André Haufe, head of the DYNAmore Material Competence Centre, "With the even better prediction quality of models for crash simulation envisioned in DigiTain, the certification of these models and the resulting envisioned homologation of products via the digital twin may be within reach."

"This not only helps to save very high development efforts in prototype building and testing, but also shortens the overall development time even further. This in turn allows development engineers to perform more optimization loops for even more sustainable designs. We are pleased to be able to play a significant part in sustainable product design with this development efforts in future."

About ARENA2036

- ARENA2036 is responsible for and works on the knowledge transfer and dissemination package in DigiTain.
- The aim is to ensure that the results and tools generated can also be used outside the consortium and to facilitate interdisciplinary scientific exchange.

At the same time, this work package forms the interface towards society in order to sensitize the general public to technological developments in terms of sustainability.



CADFEM - One of my favorite courses, CFD Simulation with ANSYS Fluent was mentioned on social media by Mahmoud Vala.

Did you know that you can choose your start date?

From this date, you will receive access to your course and a ready-installed AWS training cloud with up-to-date Ansys software for 30 days.



CFD Simulations with Ansys Fluent

In this course, we will provide you with best practice procedures to carry out fluid dynamics calculations which you can practically apply in exercises. You will thus learn all key work steps from the model selection, geometry generation and calculation through to evaluation and quality assurance of results.

After the training, you will be able to use your documents and completed example exercises to independently carry out CFD calculations, evaluate results and apply the knowledge gained to your development and research work.

Overview

- Level: Basic
- Target group: Users, Instructors
- Prerequisites: None

Benefits:

- Practical examples of internal and external fluid dynamics
- Work steps from geometry modeling to setup
- Systematic evaluation and quality assurance of results
- Background knowledge and best practice tips for Ansys Fluent

Software used: Ansys CFD

Agenda day 1	Agenda day 2	Agenda day 3
<ul style="list-style-type: none"> · Introduction to CFD · Geometry Modeling · Meshing · Setup and Simulation 	<ul style="list-style-type: none"> · Post-Processing · Turbulence Modeling · Heat Transfer · Quality Assurance 	<ul style="list-style-type: none"> · External Flow - Geometry & Mesh · External Flow - Steady-State Simulation · External Flow - Unsteady-State Simulation · Best Practices & Outlook

eLearning adds even more flexibility to CADFEM training - Decide for yourself when, where, and how often you undertake Ansys training. The new eLearning service from CADFEM, developed in collaboration with the ZEIT Academy, makes it possible. All online training courses are designed to allow easy combination with additional seminars and certification courses at any time. Current studies even suggest that blended learning, a targeted combination of eLearning and face-to-face learning, can help to consolidate knowledge in the long-term.



Oasys - Did you know that Oasys Suite 20.0 is now available!

Additionally, don't miss [the latest Oasys LS-DYNA newsletter has just been posted on our website](#), featuring a main news story about Oasys Ltd attending events in China and Japan. Check it out using the link



Oasys Suite 20.0 This latest release of our comprehensive LS-DYNA PRE and POST

processing software has all the tools required to power through your LS-DYNA workflow seamlessly. Our applications support all its latest features. **Key highlights:**

- Many new additions and updates to automotive tools across PRE and POST processing, including pedestrian, occupant, and full crash models
- New 'workflows framework' to link PRE and POST activities
- New annotations functionality to make it easier to share results, insights, and solutions
- Comprehensive support for new LS-DYNA data across your simulation workflow

Why choose Oasys Suite 20.0? Quality models and results

The Oasys tools ensure the models you produce, and the results achieved, are high quality, error-free and credible. Model interrogation tools, such as "Find attached", "Mass calculation", cut-sections, cross-references and "Model modified" make it easy to inspect the detail of your models. The best-in-class model checking tool, alongside other checking tools – including load profile, decomposition, contact penetration, and element quality checks – make it quick to identify and correct any errors.

The powerful post-processing tools available within Oasys Suite 20.0 – such as "Shift deform", force outputs, analysis and test comparison tools, and load path analysis – make it easy to gain insight into results and share with colleagues and collaborators.

Other Oasys Suite 20 features for quality models and results include:

- Annotations in D3PLOT, to highlight and share key areas of interest. Annotations will also soon be available in D3PLOT Viewer, our web-based results collaboration tool
- Further improvements to the cut-section tools across PRE and POST processing, to make it quicker and easier to view model data in the way you want
- Improved support for User Defined Materials
- Improved encryption tools to make it easier to create encrypted models and protect your data when sharing
- GLB interactive models embedded directly in REPORTER templates

Complete LS-DYNA Support - LS-DYNA is at the heart of the Oasys Suite and Oasys 20.0 supports all the new features in the latest releases of LS-DYNA. This includes support for all keywords, including the latest keywords for the multi-physics solvers. Oasys Suite 20.0 makes it easy to work with relatively simple models, or the most complex LS-DYNA models, with complete support for *INCLUDE and *PARAMETER (in all their forms), IGA, LS-DYNA output file formats, as well as comprehensive label management tools.

We also provide high quality technical support and training to our LS-DYNA users worldwide.



For Oasys Suite 20.0, new features and functionality have been added to further support the entire LS-DYNA community, including:

- Improved support for higher order elements
- Support for new IGA LS-DYNA additions

Support across the whole LS-DYNA automotive workflow - The Oasys LS-DYNA Environment has always been at the leading edge of support for automotive engineers. Our comprehensive loadcase setup tools, such as “Crash Test Setup”, pedestrian mark-up, dummy/HBM positioning and belt fitting, mass calculation/distribution, and connection creation and management, are used by engineers worldwide to create quality automotive LS-DYNA models.

Our comprehensive post-processing templates provide an out-of-the-box solution for generating results for common loadcases, and our automotive-specific data analysis tools mean that processing raw data to produce the charts you want is quick and easy. Also, PRE and POST processing tools are closely integrated, to allow sharing of information and functionality to streamline the process of working across the entire workflow, from model creation to presenting and discussing results.

For Oasys Suite 20.0, new features and functionality have been added to further support the entire automotive LS-DYNA workflow:

- More Human Body Models (HBM) supported and improved positioning functionality for HBMs
- Improvements and additions to the Seatbelt Anchorage tool
- Further additions to the pedestrian tools, including support of CAD models for markup, and additions to the HIC calculator tool
- Seatbelt fitting updates, including auto-rotation of slings during positioning
- Introducing a “Workflows” framework as an improved way of using LS-DYNA models across PRE and POST processing, including automotive assessments.

Automate your workflows - The Oasys Suite is fully customisable, and any tool or function can be incorporated into an automated workflow. The Oasys scripting API is a powerful way of extending features, introducing bespoke, organisation-specific functionality, and tapping into powerful functionality to use in new and innovative ways. This can be applied across PRE and POST processing, with model build and post-processing key areas for automation in the LS-DYNA workflow...

Speed, performance, and ease of use - LS-DYNA models continue to grow in size and complexity as the features available within LS-DYNA increase and more becomes possible using simulation. The Oasys tools continue to support these increasingly large and complex models. Graphics speed, read/write speed, and check speed are all continuously improved with each release. D3PLOT Viewer provides an easy-to-use lightweight results viewer that allows anyone to interrogate LS-DYNA results, without the need for extensive training.

Visit the website for complete information on the above and additionally:

- Other highlights:
- Documentation PDFs - For information about the above new features and other additions.

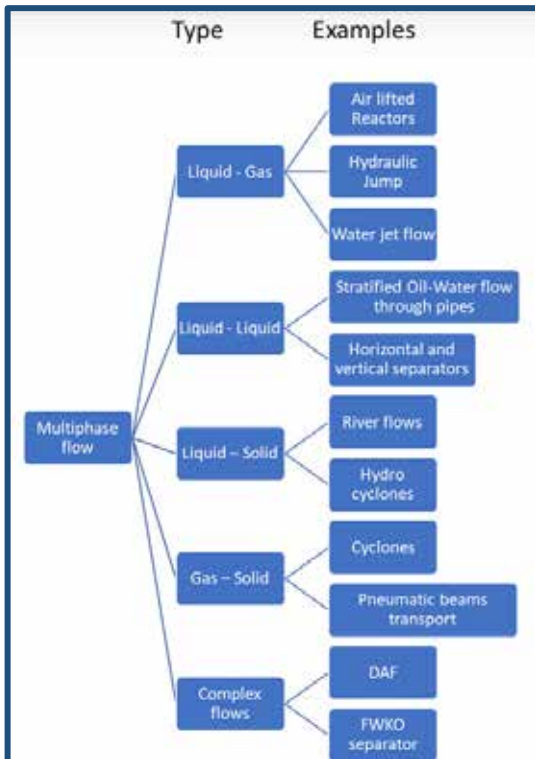


The registration for the UK Oasys LS-DYNA conference is now open.

[Register here.](#)

**OZEN Engineering - Don't miss the posts on CFD.**

Jesus Ramirez, "In the last two CFD posts, we talk about the role of CFD in the Bioprocessing industry. We emphasized the importance that mixing has on the bioreactor's performance. Today, we will turn 180°, and we will talk about the importance of separation processes in different industries and, particularly, on the role of CFD in modeling such processes."

**EXCERPT - [CFD Applied to Separation Processes: The Cyclone \(Part 1\)](#) - Posted by: Jesus Ramirez**

.Before starting, it is important to recap some basic definitions regarding the separation process. One of the main concepts that any engineer, physician, scientist, or person that works with separation processes must know is the concept of phase. Here, it is essential to note that this definition can be understood in two different ways; the first is the physical way, which says that "A phase, or state of matter, is a domain within a many-body system within which relevant physical properties are uniform.

Relevant properties may include chemical composition, stoichiometry, and density, which do not reflect how the components are arranged in space" [1]. The three main phases or states of matter are: i) solid, ii) liquid, and iii) gas. The second one is the CFD way, which states that a phase is any material that forms an interface with another materials. Regarding the last definition, a stratified mixture of oil and water is considered as a two-phase flow, even when both materials are liquids.

All these applications are widespread in different industries. CFD plays a significant role in its design and performance improvement. However, talking about all this applications would be very extensive. For this reasons, we will create a series of blogs focusing on separation processes and applications.

As a starting point, we will begin with this blog talking about a solid-gas separating application, and particularly, we will talk about the cyclone separator.

The cyclone - The cyclone is a mechanical collector whose primary function is to separate solid particles from a gas using centrifugal force [2]. This particulate matter collection equipment is the most used device in all industrial areas (energy, chemical, and cement, among others) because its simple design is absent of moving parts, which results in low maintenance costs [3]. The cyclone operation can be summarized as follows:

- The gas is tangentially entering the cyclone.
- The gas descends in a spiral pattern toward the bottom of the cone because of the cyclone geometry.
- The particles are separated from the gas and moves towards the cyclone walls. At the walls, the particles strike and lost kinetic energy. Therefore, the particles fall to the bottom of the conical section.
- Finally, the gas rises through a second spiral. This spiral has a smaller diameter than the initial spiral. The gas exits the top of the cyclone through a vertical duct known as the vortex finder.



EnginSoft wishes to acknowledge Futurities Year 19 n°1

Simone Dichiaro and Fabrizio Marcelli – MBDA For this task an optimization strategy based on genetic algorithms executed with **modeFRONTIER is coupled with the LS-DYNA implicit solver to find the best set of parameters to correctly reproduce the behaviour of a metallic material from quasi-static conditions up to high strain rate regimes**

Calibration of the Johnson-Cook plasticity for high strain rate regime applications - Simone Dichiaro and Fabrizio Marcelli – MBDA

This paper deals with the mechanical characterization of a metallic material at high strain rates.

Abstract - Material models used in structural finite element analysis (FEA) are often one of the key aspects that engineers need to describe very accurately. Particularly in applications involving high levels of plastic deformation combined with temperature and strain rate effects, the description of material behaviour by means of appropriately calibrated models and parameters is mandatory.



Since the calibration process can be equally challenging and time-consuming due to the high degree of freedom in parameter dispersion, an automated approach is best to obtain robust and reliable results. For this task an optimization strategy based on genetic algorithms executed with modeFRONTIER is coupled with the LS-DYNA implicit solver to find the best set of parameters to correctly reproduce the behaviour of a metallic material from quasi-static conditions up to high strain rate regimes.

Article Excerpt - Numerical simulation based on finite element method (FEM) technology generally accommodates the thermomechanical behaviour of metallic materials, with the advantage of greatly reducing the experimental effort required for testing and validation of components and parts. In order to obtain reliable numerical results, the calibration of material model parameters is of paramount importance, especially for high strain rate applications. The characterization of material behaviour can be very challenging, especially if the number of parameters that govern the constitutive equations is significant. In most cases, sophisticated formulations consist of multiple parameters that require dedicated calibration from different sets of experimentally measured data. Among the phenomenology-based models, the Johnson-Cook formulation [1] is one of most widely used constitutive relations for metals subject to large strain, high strain rate, and high temperature. In order to calibrate the material model parameters, it is necessary to evaluate each isolated contribution of the formulation and associate dedicated experimental tests to each, ranging from the classical tensile test to the less common Split-Hopkinson tensile test. Once the test data is available, a common approach to calibrating the material parameters is the numerical reverse engineering of the experimental test through the finite element method (FEM), matching the experimental curve to the numerical one.

About MBD - MBDA is the only European defense group capable of designing and manufacturing missiles and missile systems to satisfy the full range of current and future operational requirements of the three armed forces (land, sea and air). With a significant presence in five European countries (France, Germany, Italy, UK, Spain) and in the USA, the group offers a range of 45 missile and countermeasure systems that are already in operation with over 90 customers and more than 15 others projects are under development. MBDA is jointly owned by Airbus (37.5%), BAE Systems (37.5%) and Leonardo (25%).



DYNAMORE - On our website don't miss our case study on Creating a virtual prototype

Due to technical limitations, finite element simulations are often performed only on the most critical component or subsystem for each load case. This can lead to a collection of specialized finite element models for the same product. **With LS-DYNA it is often sufficient to build only one finite element model, a so-called virtual prototype, of the fully assembled product and use it for all load cases.**



Virtual prototype-Case study: [From CAD to a fully functional virtual prototype](#)

A one model strategy can save both a lot of time as well as increase the accuracy of the results. Here we will demonstrate how one single LS-DYNA virtual prototype can be used for several load cases, by creating a virtual prototype of a pen with all its mechanisms.

Why virtual prototypes? The LS-DYNA software is a leader in the race for simulation to match testing, and for many applications, LS-DYNA can today produce truly lifelike simulations. Even though advances in numerical solution techniques have made physically realistic simulations possible, why should one bother? There are several good reasons why customers use virtual prototypes, and the most common we encounter in our daily work with customers are

- to detect serious design flaws early, i.e. before costly testing of prototypes/production
- to quickly guide the designers in the right direction to fulfill the design requirements
- to reduce the number of prototypes
- to reduce time to market
- to optimize performance



From CAD to virtual prototype - Building a virtual prototype starts with a CAD drawing. The CAD is then converted to a finite element model in the preprocessor. In the preprocessor, it is possible to remove small design features, so-called defeaturing, that will not influence the product's structural response. Defeating simplifies the model and decreases the simulation run time on the computer. Here we used the preprocessor ANSA to create the finite element model mesh of a pen and then prepare the model for simulation in LS-DYNA.

ANSA is a complete solution covering all steps from CAD to the ready-to-run solver input file for LS-DYNA. ANSA can automatically defeature the model and has many options when it comes to meshing the model. Most of the preprocessing steps in ANSA can also be automated, a real time-saver, especially for repeated simulations of similar products.

One model – Many load cases - All the pen components are included in the finite element model – it is a true virtual prototype that can be used for all the load cases described below and many more.

Please continue to read our Case Study on our website for complete information and graphics



d3View – Did you read the blog by Bing on Simulated Annealing with Polynomial Regression - Simulated annealing is an optimization method to find the global optimum of the objective function. It is inspired by the process of metal annealing which heats the metal to a very high level and cools down in a controlled manner. In the SA algorithm, a random point is selected to start with. A new point is proposed at each iteration by making small changes to the current point.

simulation	iteration	created_on	updated_on	runner	thread	Step1	Step2	Avg_cost	Max	Min	Item_Type	HECColor	id
1	70_1200_50	1/1/2001 1:01	2001-01-01	3	1	-704.7028	-161.0235	2474769	0.410311	67.93	normal	yellow	1
2	70_1200_50	1/1/2001 1:01	2001-01-01	4.895064	3.084178	-663.3328	-164.0962	2224286	1.068103	387.6	normal	red	2
3	70_1200_50	1/1/2001 1:01	2001-01-01	2.991947	2.648436	-677.6345	-162.9516	1932220	0.784389	241	normal	green	3
4	70_1200_50	1/1/2001 1:01	2001-01-01	3.54026	4.630391	-654.8669	-153.7419	1710240	1.268674	306.4	normal	red	4
5	70_1200_50	1/1/2001 1:01	2001-01-01	4.237621	3.944476	-689.6268	-164.2626	2315667	0.742626	214.1	error	red	5
6	70_1200_50	1/1/2001 1:01	2001-01-01	1.622438	3.644476	-667.6389	-151.6664	1905495	0.954818	252.2	normal	green	6
7	70_1200_50	1/1/2001 1:01	2001-01-01	2.841462	4.881126	-684.6378	-152.7528	1970462	1.303921	411.6	error	yellow	7

Simulated annealing - The point is then evaluated by the objective function to get a score (energy, cost) so that it can be compared to the previous point. If the new point has a better score, it will be accepted; Otherwise, it is accepted with a certain probability determined by the probability distribution. This probability distribution is determined by a parameter called the “temperature”. It decreases gradually at each iteration.

The idea behind the temperature parameter is that at higher temperatures, the algorithm is more likely to accept solutions that are worse than the current solution.

This allows the algorithm to explore a wider range of solutions and avoid getting stuck in local minima. As the temperature decreases, the algorithm becomes more conservative and is less likely to accept worse solutions, which helps it converge towards the global optimum.

Polynomial Regression - SA algorithm works nicely with an objective function. When a dataset is provided, we could build a model first and use the model as an objective function.

Polynomial regression fits a polynomial curve of certain degree to the given data points. When the degree is one, it becomes linear regression. Polynomial regression can be useful in cases where the relationship between the independent variable and the dependent variable is not linear, which is usually the case. By using a higher-degree polynomial, we can capture more complex relationships between the variables.

Adaptive model-fitting - For every 100th iteration, we stop and “zoom in” to the region centered at the current best point we obtained and run the SA algorithm there locally. We compare the optimum value from this local region and compare it to the best point and update the global best point when necessary. This procedure is activated when the “shrink_factor” is between 0 and 1 (exclusive). It shrinks the range for each variable from the original domain to a certain percentage (value of the parameter shrink_factor) centered at the current global best point. When the new reduced domain is determined, we run the SA algorithm on this region to find the optimum. This will generate a new polynomial regression model with the same parameters on a smaller domain. It will depict a more accurate local surface that can be used as the objective function.

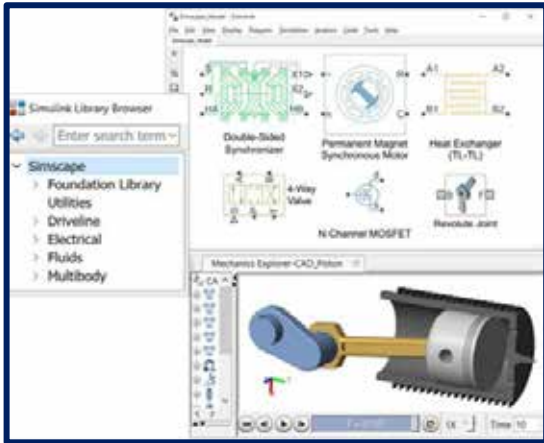
SA optimization on d3VIEW - In d3VIEW Workflow, there is a worker “dataset_simulated_annealing_optimizer” to perform the SA optimization. First, we upload the dataset and select the input and target variables (X and Y columns).

Please continue our blog article by Bing on the website



FIGES AS - Control system engineers use MATLAB and Simulink at all stages of development, from facility modeling to designing and adjusting control algorithms and control logic, to automated code generation and system validation, validation and testing, and implementation. See the excerpt below to learn the solutions offered by MATLAB and Simulink in the field of control systems and to get support from our expert engineer staff.

Control systems - Control system engineers use MATLAB and Simulink at all stages of development – from plant modeling to designing and tuning control algorithms and supervisory logic, all the way to deployment with automatic code generation and system verification, validation, and test.



- A multi-domain block diagram environment for modeling plant dynamics, designing control algorithms, and running closed-loop simulations.
- Plant modeling using system identification or physical modeling tools.
- Prebuilt functions and interactive tools for analyzing overshoot, rise time, phase margin, gain margin, and other performance and stability characteristics in time and frequency domains.

- Root locus, Bode diagrams, LQR, LQG, robust control, model predictive control, and other design and analysis techniques.
- Automatic tuning of PID, gain-scheduled, and arbitrary SISO and MIMO control systems.
- Modeling, design, and simulation of supervisory logic for performing scheduling, mode switching, and fault detection, isolation, and recovery (FDIR)

Model and Simulate Plant Dynamics - Use MATLAB and Simulink to build accurate plant models. Describe the complex dynamics of your plant using a variety of supported modeling approaches, and use the most appropriate approach for each component in your plant to create the system-level plant model.

Estimate plant dynamics from input-output data using system identification when you do not know the detailed structure of the model. Alternatively, create complex multidomain plant models without having to derive the underlying first-principles equations using physical modeling tools. Use blocks that represent mechanical, electrical, magnetic, hydraulic, pneumatic, and thermal components to map the component topography and physical connections of your system.

Design and Tune Feedback Compensators - Analyze and develop closed-loop compensators, and assess key performance parameters, such as overshoot, rise time, and stability margins. Trim and linearize nonlinear Simulink models. You can also model and analyze the effects of uncertainty on the performance and stability of your models.

Take advantage of Bode plots, root locus, and other linear control design techniques and automatically tune PID controllers in a simulation model or on test hardware. Prebuilt tools let you automatically tune decentralized multivariable controllers and leverage advanced control strategies, such as model predictive control and robust control. Use optimization methods to compute controller gains to meet rise-time and overshoot constraints. **Article continued on the FIGES website.**



HEXAGON - HxGN LIVE is a digital reality technology event series built for the future, providing access to Hexagon’s latest sensor, software and autonomous technologies. Our goal is to empower pioneers across industrial, manufacturing, infrastructure, safety and mobility applications to put data to work.

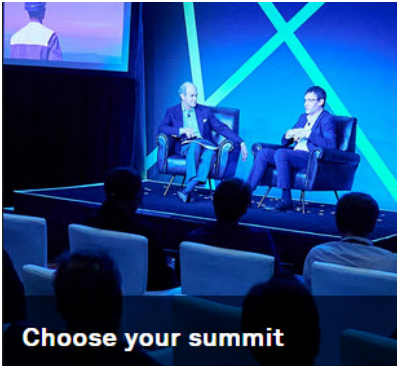
HxGN LIVE Global 2023 - 12-15 June in Las Vegas, NV

About Hexagon’s digital reality technology conference

At HxGN LIVE Global, our flagship conference, you’ll experience innovative and inspiring keynotes detailing the future and power of digital reality and autonomy. The event’s topic-centered summits offer unique content tailored to your industry and expertise. Hear from key leaders and experts in your field and expand your business with thought leadership and future-focused conversations.



Attended by future-focused automation experts from all over the world, HxGN LIVE Global offers the chance to meet face-to-face, gain expertise and spend time hands-on with the latest innovative technology.



Summits

- Autonomy & Positioning Innovation Summit
- Digital Defense Summit
- Digital Industrial Facilities Summit
- Digital Innovation in Construction Summit
- Future of Public Safety Summit
- Future of Manufacturing Summit
- Geospati Asset Management Summit
- Intelligent Mining Summit
- Pure Surveying Summit

Among the Sessions offered:

- The road less travelled: Autonomous off-road platooning
- Revolutionizing Flood Management with Real-Time Visualization and Insight
- Prioritizing risk in industrial cybersecurity
- Reality of the Defense Metaverse
- Hands-on training - Waypoint post-processing software (sign-up required)
- Hands-on training - HxGN OnCall Dispatch | customer rules engine
- ETQ user training - ETQ designer fundamentals (sign-up required)
- Getting started with MinePlan 3D
- Managing drillholes with MinePlan Drillhole Manager (sign-up required)



Visit the Hexagon’s digital reality technology conference for complete information & Registration



Abhinav Tanksale, CAE Analyst and a passionate blogger, [My Physics Cafe](#)

The automotive industry is one of the most globalized industries in the world. In order to remain competitive, manufacturers must source parts and materials from around the world. This has led to a rise in outsourcing, as manufacturers seek to find the best supplier for each component.

My top 5 Reasons Why Car Manufacturers Outsource

The Auto industry operates primarily around three levels of suppliers: Original equipment manufacturers (OEMs), Tier 1 suppliers, and Tier 2 suppliers.

Tier 1 suppliers are the direct suppliers to the OEMs, while Tier 2 suppliers are the suppliers to the Tier 1. Initially, OEMs typically outsourced non-essential tasks, such as assembly and logistics, to service providers. However, in recent years, OEMs have also started outsourcing more essential tasks, such as design and engineering.



Let's look at the top reasons why auto manufacturers outsource:

- 1) **Outsourcing provides access to a global talent pool:** When automakers outsource their production and design activities, they are able to access expertise from around the world. This is especially beneficial when it comes to complex techniques, such as the production of car bodies and engine components.
 - By tapping into a global talent-pool, automakers are able to find the best technical and design specialists to improve their production processes.
 - Furthermore, outsourcing allows them to work with specialists who are highly knowledgeable and experienced in their particular area. This can result in better quality and more reliable products.
- 2) **It's cost-effective:** One of the biggest benefits of outsourcing is cost savings. Automakers can reduce their costs significantly by outsourcing. Since labor costs can vary from country to country, outsourcing can help them find the cheapest labor source for their needs.
 - In addition, the cost of renting and maintaining manufacturing facilities can be greatly reduced.
- 3) **It helps them focus on core competencies:** Automakers often outsource activities that are not part of their core competencies. This allows them to focus their efforts on their core competencies, such as developing new technologies and innovative products.
 - By outsourcing these activities, automakers can free up resources to invest in their core business, while still meeting their production needs.
- 4) **It speeds up the production process:** By outsourcing parts and components, automakers can expedite the production process. It allows them to purchase components quickly and easily, without waiting for them to be manufactured in-house.
 - This can reduce lead times and increase the speed of production, resulting in shorter delivery times.
- 5) **It facilitates scale:** Finally, outsourcing helps automakers scale quickly. By having access to larger quantities of parts and components, they can produce more vehicles in less time. Furthermore, they can produce vehicles faster and more efficiently, resulting in higher profits and greater customer satisfaction.

In conclusion, outsourcing has become increasingly popular in the automotive industry. By leveraging the expertise of global suppliers, automakers reduce costs, increase efficiency and focus on their core competencies. Ultimately, it helps automakers stay competitive while maximizing their profits.



HANS is the human body model from DYNAmore

RheKen is the AI reporter from FEANTM

	<p>HANS - Hello, my name is Hans, & I'm a friend of Rheken, the town AI reporter. I'm from Germany & working remotely.</p> <p>My main job is working for DYNAmore in Germany as their Human Body Model. RheKen invited me to co-host the events page and visit the town.</p> <p><u>Did you know that I have a newsletter? – I call it HANS</u> (Yeehaw! I learned to yell that from the Old Cattle Rancher)</p> <p><u>Did you know that RheKen has a pdf newsletter? – She calls it RheKen</u></p>	
Hans		RheKen



[Oasys LS-DYNA Conference](#)

**June 08
Birmingham, UK**



[HxGN LIVE Global 2023](#)

**June 12-15
Las Vegas, NV, US**



[AVICENNA Days](#)

**Oct. 10-11-12
On Line Insilico
healthcare**



[The 14th European LS-DYNA Conference](#)

**October 18 &19
Baden-Baden,
Germany**

[About me, Hans:](#) I am based on the geometry of a 50-percentile male adult. At this time my model development will focus on the following key aspects:

My Level of detail	I will have realistic modeling of the musculoskeletal system for detailed analyses of the skeleton and musculature at the geometry and material level
My Robustness	I will include having robustness considerations during meshing and material card generation
My Efficiency	I will have moderate element count and sparing use of "expensive" solver features
My Usability	I will escort the entire workflow with positioning concepts, tools for pre- and post-processing as well as user support

Welcome to our Town hall & Coffee Cafe. Coffee, of course vanilla, hazelnut, and other flavors are courtesy of our favorite coffee shop (not the rival coffee shop).



Today we visited the booths listed below on YouTube Current Content:

Free Coffee for visiting

[Rescale](#)

SUSTAINABILITY IN COMPUTING

1:05

COLLABORATION

0:51

[DYNAmore](#)

UTC Dresden
Lightweight Structures and Materials and Robust Design (Leibniz Prof. Guide)

38:25

AIMM
ARTIFICIAL INTELLIGENCE IN MATERIAL MODELS

2:31

[OZEN Engineering](#)

ANSYS

19:47

Design steps

- Specify desired optical response (focal length, wavelengths, NA etc.)
- Obtain height profile using DES algorithm
- Import height profile in Lumerical FDTD
- Perform FDTD simulations to obtain near-field data
- Using Lumerical farfield functions, obtain far field profiles at long distances

13:57

[OASYS](#)

4:43

6:02



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

What is Automotive NVH? Ask a child what sound a car makes, and the typical answer is, “vroom-vroom!” Ask an automotive engineer the same question, and the response will be much more complex. From the hum of wind passing a side mirror to the enhanced acceleration of an electric vehicle, the many sounds a car makes are critical to the overall driving experience. To design, identify and optimize automotive sounds, engineers rely on a field called NVH.



Excerpt [What is Automotive NVH](#)© ANSYS Blog

Author - Hardik Shah

What is NVH? Noise, vibration, and harshness (NVH) is the study and measurement of aural and tactile feedback in an object. Because sounds can be both an annoyance and a benefit, NVH analysis helps identify where a sound is coming from and why. Engineers can then reduce or eliminate unwanted noises, as well as enhance beneficial sounds — such as the signature rumble of a motorcycle — through a combination of simulation and physical testing methodologies.

What Does NVH Stand for? The three parts of NVH cover a range of sound indicators — how it is heard, how it is felt, and whether it is perceived to be pleasant or annoying.

Noise: the sound propagation caused by a specific object, such as the hum of an opening sunroof, an engine, a door being slammed, an HVAC system, or seat belt buckle clicks.

Vibration: the oscillations that occur at a certain frequency. In a car, vibrations can be felt at different speeds through the steering wheel, seat, armrests, floor, and pedals.

Harshness: the subjective quality associated with noise and vibration. While both noise and vibration are quantifiable measurements, harshness deals with the discomfort of hearing unpleasant sounds. What is harsh to one person may not be harsh to another.

What is NVH in Cars? NVH techniques are applied across a variety of industries, but they began in the automotive industry to address the rumbling, knocking, and grinding generated by combustion engines.

NVH is currently a key performance indicator in the automotive industry, particularly as more automotive manufacturers begin to electrify their fleet. Vehicle NVH performance can make or break brand image easily, so it is critical to address NVH issues early in the design stage.

Read “How Simulation Helps You Overcome Electric Machine NVH Design Challenges” to learn more.
Sources of NVH in Cars

There are three sources of NVH in vehicles:

- Aerodynamics: HVAC fans, wind against the car body
- Mechanical: brake friction, engine operations, tire contact with the road
- Electrical: driver alerts, inverters in electric cars

Being able to identify sounds coming from sources such as the engine, brakes, car body, and interior gives engineers a full audio picture of the vehicle. Once the source of a particular sound is understood, engineers



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

can determine the right sound control techniques, such as substituting materials, changing interaction flows, or installing sound barriers.

To create the best overall driving experience and gain a competitive edge, automotive companies have many sound-based goals that NVH helps them address, including:

- Increase driver and passenger comfort.
- Reduce vibration-based failures.
- Create a desired sound or vibration.
- Adhere to noise regulations.
- Minimize tonal noises.
- Ensure structural reliability and improve lifespan.
- Minimize operator fatigue by providing a quiet environment.

How is NVH Analysis Conducted? Humming tires, whistling wind, squeaky wipers — there are dozens of sound sources in cars that can be sensed audibly, visually, and tactically. NVH analysis can help reduce or eliminate the undesirable ones. To optimize sounds against desired criteria, engineers can use acoustic solvers for simulating vehicle noise at multiple levels of design.

Acoustics Simulation Levels

- Full-vehicle level - Noise generated by the full car in motion.
- System level - Noise coming from machines working together.
- Sub-system level - Noise coming from a specific machine, such as an e-motor.
- Component level - Noise generation from an individual element, such as a seat belt click.

To complete an NVH analysis based on different simulation levels, engineers must first create a simulation model that accurately represents the physical system or component. Ansys tools such as Ansys Mechanical, Ansys LS-DYNA, Ansys Fluent, Ansys Motor-CAD, and Ansys Maxwell can be used to simulate and model the necessary components, and post-processing can be performed in Ansys Sound....

Challenges of Simulating NVH - A common mistake engineers make when simulating NVH is that they start right away with highly complex and computationally expensive simulations. This is a problem because those models often don't match up with physical behavior. As a result, time and resources are wasted on an analysis that doesn't match physical test results.

It's important that basic quantities of simulation models like overall mass, stiffness, and damping matrices are well correlated with physical testing using parameters like modal assurance criteria (MAC), coordinate modal assurance criteria (CoMAC), and frequency response assurance criteria (FRAC) before running highly complex analyses.

Getting Started with NVH - Just about every element in automotive design can benefit from NVH analysis. Understanding noise sources and how to optimize them is one of the best ways to ensure your automotive design will meet buyers' needs and industry standards. Implementing simulation as early as possible in the concept and design phase will help ensure that NVH issues are resolved as possible before physical prototyping begins.



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

Endurance test at -26 degrees: Mercedes-Benz tested the latest generation of brake control systems on drives in Arjeplog, Sweden, near the Arctic Circle.



[The latest generation of brake control systems for future electric platforms by Mercedes-Benz in winter testing at the Arctic Circle](#)

Safety, efficiency, driving comfort: Test drives provide the development team with important insights

For more than 20 years, an official branch of the Sindelfingen plant has existed here: its very own test centre for testing in the most extreme conditions. In addition to the EQE, EQS, EQS SUV and EQE SUV, models of future vehicle generations based on future platforms were also used in the drives across a frozen lake and up the region's highest mountain.

“During the test drives, our team is primarily concerned with safety, efficiency and driving comfort. The development team tunes the brake control systems individually for each model series – and pushes them to their physical limits.” Christoph Böhm, Head of Brake Control Systems, Mercedes-Benz AG

On the way to an all-electric future, the team is working on a new generation of stability control systems. These make use of the properties of the electric drive to precisely control the torque at the wheels.



Most drivers will probably never notice how hard their Mercedes-Benz vehicles work to keep them out of dangerous situations – for Böhm and his team, this is the definition of a job well done.

Endurance tests on ice and snow

Since Mercedes-Benz established the test facility near Arjeplog, the vehicles have changed a lot. However, the reasons for coming here are still the same: compared to dry asphalt, the grip level on ice and snow is up to 90 per cent lower. These serious differences have a profound effect on the stability and controllability of a vehicle, especially when accelerating, stopping and changing direction. Another advantage is that the weather conditions and surfaces remain relatively constant throughout the winter in the Arctic Circle. The test vehicles are equipped with standard all-season or winter tyres in order to best reflect the everyday usage behaviour of customers.

Full Article with more pictures can be viewed on their website article



Excerpt facts of the [22 Fast Facts on the Bell Boeing V-22 Osprey](#) - All you need to know about the world's first ever tiltrotor aircraft - **Gianna Messina**

- **The Bell Boeing V-22 Osprey is the world's first successful military tiltrotor to take to the air and the largest active production line for tiltrotors**
- In March 1989, the V-22 took off for its first flight in Arlington, Texas

- **The V-22 main assembly facility is in Amarillo, Texas, or commonly known as Rotor City, USA, due to the V-22's profound presence in the Texas Panhandle skies**
- The production group behind the V-22, more commonly known as "Team Osprey", consists of more than 500 US-based suppliers and employs over 27,000 people across 44 states
- As a joint service military provider, the U.S. Marines, U.S. Air Force, U.S. Navy, and Japan Ground Self Defense Force currently operate their own variants of the V-22 model – MV, CV, CMV, and Japan MV, respectively
- Coupled with a rotating wing and rotors that fold horizontally, the V-22 can be stored aboard an aircraft carrier or assault ship – allowing the tiltrotor aircraft to be transported to complete missions worldwide
- The V-22 is used for a wide-range of missions, including long-range infiltration, exfiltration, medium-range assault, special operations, VIP transport, resupply, disaster relief, search-and-rescue, medical evacuation, and humanitarian missions
- **This multi-engine aircraft is equipped with dual Rolls-Royce Liberty AE1107C engines**
- Up to 24 personnel can sit inside the tiltrotor aircraft
- With aerial refueling capability using high-speed drogues, the V-22 allows continuous flight for several hours or more
- The V-22 travels nearly twice as fast as most average helicopters
- **The V-22's speed and wide coverage area allows for rapid response time during the "Golden Hour", or the first and most critical hour after an incident**
- The V-22 is equipped with complete runway independence technologies, allowing it to take off and land wherever it's needed the most
- At present, the V-22 has surpassed more than 700,000 flight hours
- Starting in December 2021, Bell began offering improvement kits for the V-22's two nacelles to maintain the reliability rate and boost mission readiness
- CV-22 nacelle improvement program recently surpassed 1,000 flight hours - strengthening endurance for its full range of military operations
- Equipped with modern fly-by-wire controls, the V-22's high-tech equipment allows for less pilot workload and more situational awareness
- The V-22 model was developed from more than 85 years of Bell pioneering innovative vertical take-off and landing (VTOL) configurations like the X-14, X-22, XV-3, XV-15, and eventually the V-22
- With corrosion resistant coatings and blade-fold for shipboard storage, the V-22 is designed to successfully navigate in the world's harshest environment.



GE Marine has signed a license agreement with TEI (TUSAS Engine Industries, Inc.) based in Eskisehir, Türkiye,

With this agreement, TEI becomes the authorized in-country service provider for the maintenance, repair and overhaul of LM2500 marine gas turbines. In addition to the GE gas turbines used in the Turkish Navy, we will also be able to serve various global navies using the LM2500 and ships exported and to be exported by Turkey.

...This new agreement demonstrates GE's deep commitment to Türkiye's shipbuilding industry. TEI is a leading global manufacturer of defense power, leveraging its many years of experience supporting the Turkish defense industry, in partnership with GE. GE Marine and TEI have collaborated in Türkiye for many years and are now poised to play a critical role in supporting the Turkish shipbuilding industry for many more.

"GE is pleased to be a trusted partner in Türkiye supporting Turkish Naval Forces with the LM2500 and the solidification of this license agreement with TEI. The significant expansion of the LM2500 MRO global network directly benefits Turkish Naval Forces and Turkish Shipbuilding Industry." said Mark Musheno, Vice President, Sales and Marketing, GE Marine.

The LM2500 is the world's most popular marine gas turbine and is derived from GE's TF39 and CF6-6 aircraft engines. Currently, GE has delivered or has on order 31 LM2500 gas turbine onboard 18 ships for Türkiye. Programs include the Barbaros, Gabya and ISTIF class frigates (MILGEM-I), the Ada class (MILGEM) corvettes and the DIMDEG fleet oil replenishment vessel.

"We are very excited by TEI's addition to LM2500 Marine Engine Global MRO Service Supplier Network. With this license granted from our long-term partner GE, TEI becomes an OEM Certified MRO Service Provider to meet the MRO demand of Turkish Navy as well as the Navies of several other countries worldwide." said Prof. Mahmut Faruk Aksit, General Manager of TUSAS Engine Industries Inc. (TEI).

"With our planned investments in the field, we are quite confident that our company will offer its best-in-class MRO service for LM2500 Marine Engines with on-time-delivery, highest quality standards, low turn-around-times at competitive price levels. TEI will make special-to-project investments and gain the required capability and capacity in Türkiye with the support of our eco-system and existing in-country infrastructure. We strongly believe our strong commitment and cooperation will lead to another success story." Aksit added.

GE Marine and TEI will continue to identify other ways to further localize key manufacturing processes, such as the assembly, installation, and testing of the LM500 and LM2500 gas turbines.

This will further strengthen the localization and indigenization priorities of the Turkish government and defense industry by maximizing local content. TEI is one of the largest producers of parts for the LM2500 gas turbine, as well as a licensed MRO facility for GE's T700 engine, used in Black Hawk, Seahawk, Super Cobra and Apache helicopters, and GE's F110 engine, used in F16 and F15 fighter aircrafts.

TUSAS Engine Industries Inc. (TEI) is an incorporated company established in 1985 as a joint venture of Turkish Aerospace Industries Inc., General Electric (GE), Turkish Armed Forces Foundation (TAFF) and Turkish Aeronautical Association (TAA).



Town Airport Quiz

May

The quiz was left in the suggestion box by The Old Retired Pilot. We are sending it out to the residents and guests. No one in town knows his name. You yell, "HEY, Old Pilot."

Answers are on the last page –AND we had it previously - you should know the answers.

A hint for "D" - The town supervisor makes them, and it's as close to a plane or helicopter she will ever be allowed to fly.

(The answers are at the bottom of the Goodbye page)



A _____



B _____



C _____



D ____ YES, it does fly - directly into her wall



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

US Airforce Red, White & Blue



Thunderbirds demo

The United States Air Force Air Demonstration Squadron "Thunderbirds" perform at Cocoa Beach, Florida, April 14-16, 2023. The Thunderbirds headlined the Cocoa Beach Air Show, which allowed them to demonstrate the pride, precision, and professionalism of total force American Airmen to thousands of spectators on the Space Coast. (U.S. Air Force photo by Staff Sgt. Dakota Carter)

PHOTO BY: Staff Sgt. Dakota Carter



A team effort

A B-52 Stratofortress assigned to the 2nd Bomb Wing at Barksdale Air Force Base, La., undergoes maintenance at Andersen AFB, Guam, in support of a Bomber Task Force mission, April 11, 2023. More than 210 Airmen and four B-52s recently arrived on the installation in support of U.S. Indo-Pacific Command BTF missions to offer aircrews the opportunity to familiarize themselves with operating in a joint and coalition environment

.(U.S. Air Force photo by Airman 1st Class William Pugh)



Home sweet home

Master Sgt. David Schnabel, 8th Expeditionary Airlift Squadron first sergeant, is welcomed home from a deployment by a loved one at Joint Base Lewis-McChord, Wash., April 4, 2023. The deployment was the 62nd Airlift Wing's first under the new Air Force Force Generation Model in support of U.S. Central Command, U.S. European Command and U.S. Africa Command operations.

(U.S. Air Force photo by Senior Airman Callie Norton)



Marco Evangelos Biancolini

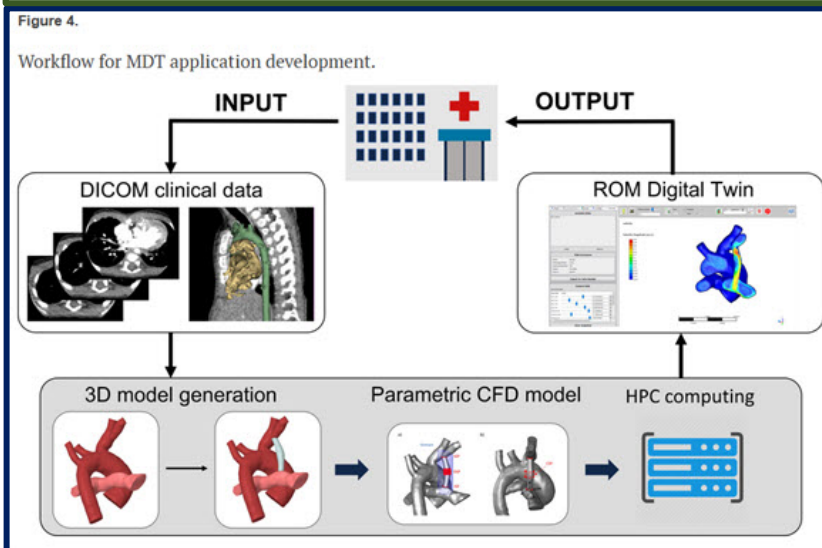
RBF Morph CTO & Founder - Associate Professor of Machine Design



Federica Galbiati
ESR 07

Read the latest publication in collaboration between BioCardioLab FTGM and our Federica Galbiati ESR 07 of the MeDiTATe-project.

A new paper “HPC+ in the medical field: Overview and current examples” has been published in the Technology and Health Care Journal



[HPC+ in the medical field: Overview and current examples](#)

The paper was written by several authors including Federica Galbiati ESR 07 of the MeDiTATe project as well as Simona Celi & Emanuele Vignali (BioCardioLab FTGM). A further contribution was given by other authors affiliated to partners and beneficiaries of the MeDiTATe project: Marco Evangelos Biancolini & Stefano Porziani from RBF Morph, Emiliano Costa from Rina Consulting as well as Claudio Arlandini and Antonio Memmolo from CINECA

The abstract is as follows:

To say data is revolutionizing the medical sector would be a vast understatement. The amount of medical data available today is unprecedented and has the potential to enable to date unseen forms of healthcare. To process this huge amount of data, an equally huge amount of computing power is required, which cannot be provided by regular desktop computers. These areas can be (and already are) supported by High-Performance-Computing (HPC), High-Performance Data Analytics (HPDA), and AI (together “HPC+”). This overview article aims to show state-of-the-art examples of studies supported by the National Competence Centres (NCCs) in HPC+ within the EuroCC project, employing HPC, HPDA and AI for medical applications. The included studies on different applications of HPC in the medical sector were sourced from the National Competence Centres in HPC and compiled into an overview article. Methods include the application of HPC+ for medical image processing, high-performance medical and pharmaceutical data analytics, an application for pediatric dosimetry, and a cloud-based HPC platform to support systemic pulmonary shunting procedures. This article showcases state-of-the-art applications and large-scale data analytics in the medical sector employing HPC+ within surgery, medical image processing in diagnostics, nutritional support of patients in hospitals, treating congenital heart diseases in children, and within basic research. HPC+ support scientific fields from research to industrial applications in the medical area, enabling researchers to run faster and more complex calculations, simulations and data analyses for the direct benefit of patients, doctors, clinicians and as an accelerator for medical research.

Paper continues on website



Excerpts from the Avicenna Alliance: Predictive medicine or “in silico medicine” as a broader term, is the use of computer modelling and simulation in the diagnosis, treatment, prevention of a disease and development of products.

AAD 2023



AVICENNA DAYS

A comprehensive update on recent progress and achievements related to the adoption and deployment of in silico methods for the entire healthcare community.

· [REGISTER](#)

2 days 4 hours - Oct. 10th-11th-12th 2023

- Tues. 10 - “Uncovering the regulatory pathway”
- Wed. 11 - “Research & Technology: Building reliable models”
- Thurs. 12 - “Involving and serving the Patients”

- **Review** the plans to make digital evidences and in silico methods a reality in academic and industrial research, for both regulatory and clinical applications.
- **Explain** the role of computer modeling and simulation (CM&S) also known as In Silico methods for the regulatory approval process,
- **Accelerate** the adoption of Digital Evidence for faster, safer and more affordable health care solutions to the patient and the role of the Avicenna Alliance
- **Future** - what you should expect in the foreseeable future discussed by Regulatory, Academic and Industry thought leaders.



THE AVICENNA ALLIANCE is a global non-profit including members from Europe, Americas, Asia and Oceania.

The Avicenna Alliance advocates regulating and deploying computer modeling and simulation (in silico methods).

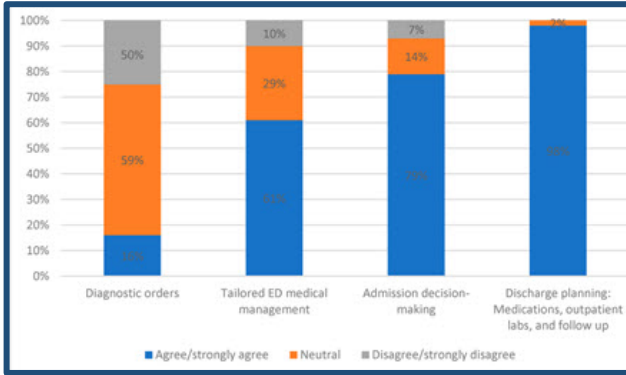
In silico has the potential to:

- **Allow phase one clinical trials to be done on computer rather than on animals**, greatly reducing the costs for researchers and helping to achieve a reduction in animal testing as has been frequently called for by the European and national Parliaments;
- Enable modelling of implants tailored to the individual so that scandals such as the metal on metal hip implant incident can be avoided completely and patients receive implants fitted to suit them, improving patient safety;
- Provide training for young healthcare professionals so that surgeons can perform surgeries “in silico” making mistakes over and over virtually to avoid real mistakes on real patients;
- Reduce the unnecessary use of drugs by processing individual patient data so that the patient receives the right treatment for them, reducing costly hospital stays and expediting their recovery.



Town Voted - A favorite Kaiser Permanente Doctor is Dr. Combitis, Kaiser Livermore, CA.

...Our study team recently developed a machine learning (ML)-based AHF risk prediction tool to predict the risk of a 30-day severe adverse event [6]. As we prepare to implement this tool into real-time clinical workflows, we plan to assess feasibility (including technical aspects of electronic health record (EHR) build, score calculation timing, handling of missing data, and clinician-facing display), acceptability (provider use of tool and adoption of recommendations), and utility (impact of tool on key clinical outcomes)....



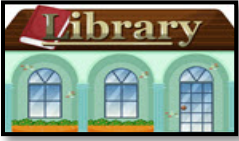
Barriers and Opportunities Regarding Implementation of a Machine Learning-Based Acute Heart Failure Risk Stratification Tool in the Emergency Department

Full affiliations can be viewed on the publication
Dustin G. Mark, Dana R. Sax, Kaiser Permanente
Jamal S. Rana, Mary E. Reed, Kaiser Permanente
Lillian R. Sturmer, College of Osteopathic Medicine

Figure - General considerations for implementation of risk tools and CDS in the ED

Abstract -Hospital admissions for patients with acute heart failure (AHF) remain high. There is an opportunity to improve alignment between patient risk and admission decision. We recently developed a machine learning (ML)-based model that stratifies emergency department (ED) patients with AHF based on predicted risk of a 30-day severe adverse event. Prior to deploying the algorithm and paired clinical decision support, we sought to understand barriers and opportunities regarding successful implementation. We conducted semi-structured interviews with eight front-line ED providers and surveyed 67 ED providers. Audio-recorded interviews were transcribed and analyzed using thematic analysis, and we had a 65% response rate to the survey. Providers wanted decision support to be streamlined into workflows with minimal disruptions. Most providers wanted assistance primarily with ED disposition decisions, and secondarily with medical management and post-discharge follow-up care. Receiving feedback on patient outcomes after risk tool use was seen as an opportunity to increase acceptance, and few providers (<10%) had significant hesitations with using an ML-based tool after education on its use. Engagement with key front-line users on optimal design of the algorithm and decision support may contribute to broader uptake, acceptance, and adoption of recommendations for clinical decisions.

Excerpt - 1. **Introduction** - Emergency department (ED) risk stratification and identification of lower-risk patients with acute heart failure (AHF) who may be amenable to safe outpatient care continues to present a significant challenge. There are over one million ED visits across the United States each year for AHF, and 80% of patients are admitted to hospital [1]. Hospital admissions and readmissions continue to increase [2], and total annual costs for heart failure are estimated to reach \$70 billion by 2030, with 80% being due to hospital admission [3,4].



Thanks to R. Harik for bringing the information to our notice by using social media

Augustus Fountain, Professor at Univ. of South Carolina “I am very proud to have started this program at USC.” The forensic chemistry class, taught by Dr. Way Fountain of the Dept. of Chemistry and Biochemistry, is part of a new forensics minor.



EXCERPTS

[New minor aims to meet need for SC forensic scientists](#)

By Laura Erskine (© Univ. of South Carolina)

On the first day of her forensic chemistry lab, Molly Kantor walked into a room cordoned off with yellow crime scene tape. She stepped carefully to avoid the broken glass that littered the floor. A storage container with a broken lock sat in the corner.

“We saw the casing from a spent bullet, and there was a fake body with blood spatter on the wall and floor nearby,” Kantor says.

Picture - A. Fountain, Prof. Univ. of SC

Students took pictures and noted measurements for everything they saw in the fictional crime scene, trying to find clues for what may have happened.

“I felt like I was putting together a puzzle,” says Kantor, a freshman anthropology major at the University of South Carolina. “Bringing relief to the families and those affected is my reason behind doing this for my future career. I want to try to help in some way.” Kantor aspires to work for the FBI as a forensic scientist.

Throughout the semester, Kantor and her classmates learned about the techniques needed to analyze the evidence found in crime scenes. Kantor is one of the first in the new program, which will help USC students meet a need for forensic scientists in South Carolina.

“There are several active forensics labs in the state, in addition to those that hire contractors,” Fountain says. “One of the challenges for these agencies is that they have to recruit from out of state.”

Fountain has been working with the South Carolina Law Enforcement Division and other agencies to develop courses to equip students with skills for forensics jobs. After a long career as one of the most senior chemists with the U.S. Army, Fountain has a passion for forensics and the expertise to bring the program to fruition. He was a professor at West Point before serving as a senior research scientist for the Pentagon and the Aberdeen Proving Ground, where he started the Army’s counter-IED forensics program. He worked to identify explosives and use the evidence to help determine who was behind bombings during the wars in Iraq and Afghanistan.

...“This program is an opportunity for students to learn about forensic science and make decisions on whether this is the type of career they want to pursue,” Fountain says.

While TV shows and movies about forensic work often show analysts coming up with instant answers and a perfect match in a convenient database, the science is more complicated. Fingerprints, for example, rarely if ever line up perfectly. A forensic analyst finds similarities between a sample and the partial, imperfect prints found at a crime scene to make the case.



The Old Cattle Rancher's Ranch
**No one knows his name.
You yell, "HEY, old rancher."**

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

Videogame

I found a great videogame thanks to a social post by Peter Nazmyon & reply by Marco Biancolini.

Marco Evangelos Biancolini RBF Morph , "For advanced mesh morphing in Fluent consider RBF Morph. It makes complex transient mesh morphing feasible for very challenging configurations. Here an example presented in 2020 showing morphing wings for a videogame we created."



RBF MORPH – [YouTube Video](#)

This simple videogame shows how the digital twin concept can be deployed.

The software ANSYS Fluent and RBF Morph are used to create a parametric aircraft. The physics is then, adopting the reduced order model technology of ANSYS Twin Builder.

The interactive video game is quite simple: the player sets up the aircraft and then experiences how far it can fly!



You will experience the flight simulator.

You will be visiting Venice.

Why is Venice the perfect location?

- you need water
- while playing you can enjoy the landscape.

The set up of your aircraft will make the difference between:

- a poor flight
- an average flight
- a good flight

Welcome on board.





Thank you for joining me on my visit to this month's museum. I visit a museum every month.



[The MAUTO – Museo dell'Automobile of Turin](#) boasts one of the rarest and most interesting collections of its kind, with over 200 original cars of 80 brands from all over the world. It is one of the most famous automotive museums in the world, but it is not only aimed at motoring enthusiasts. The oldest items in the collection are linked to the history of its founder, Carlo Biscaretti di Ruffia, who collected cars, chassis and engines with enthusiasm and determination. His work was patient and stubborn and – as he himself said – “it consists above all in discreetly disturbing everybody that comes within range to ask them: do you happen to know if there's an old car anywhere?”



**Triciclo a vapore Pecori,
1891**



Peugeot Tipo 3, 1892



Legnano A 6/8 HP, 1908



Fiat 8 HP, 1901

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



Town secretary
My LAST Crossword puzzle on history

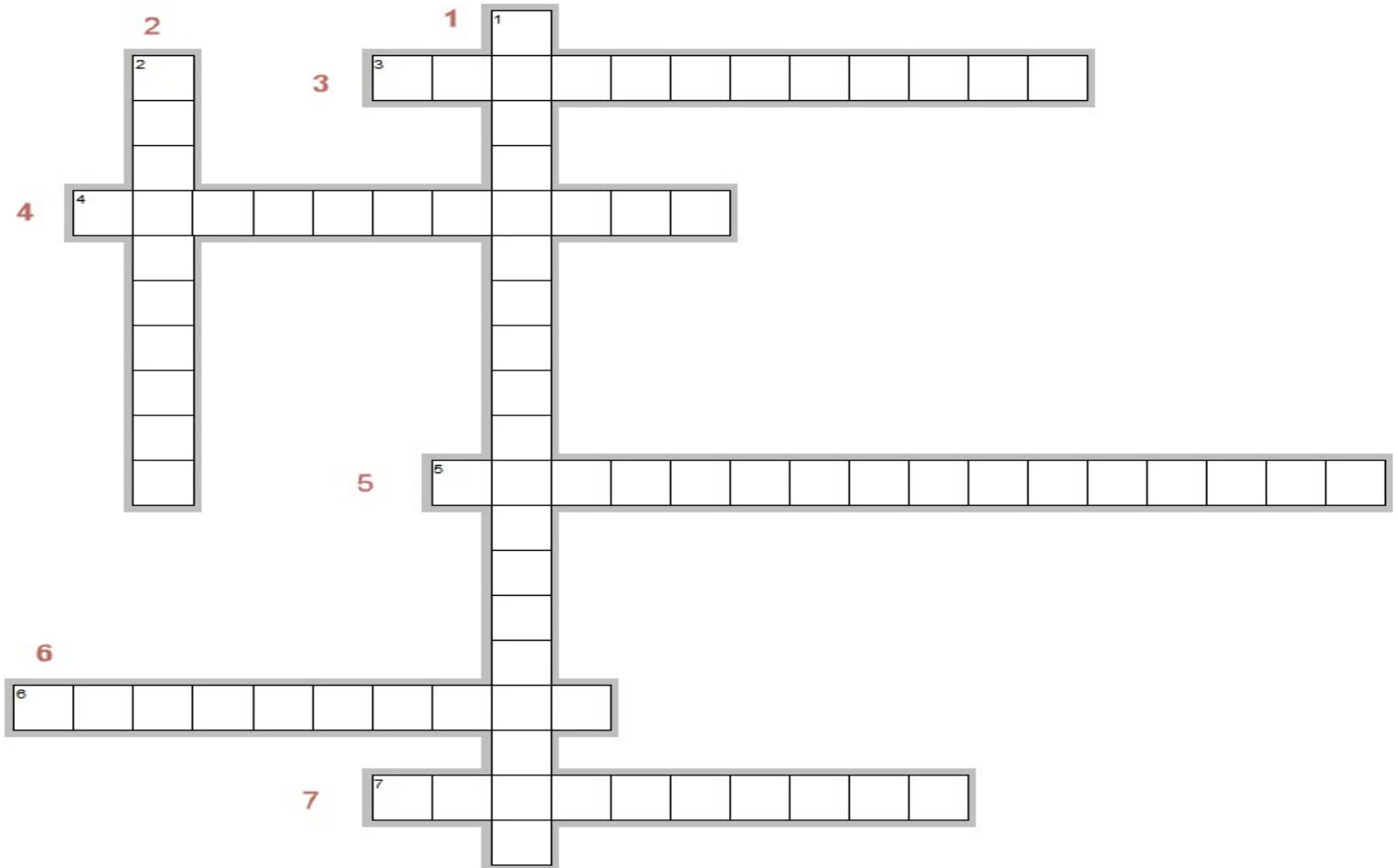
May

Across

3. The Swedish inventor who designed the world's first printing calculator. (his son was Edvard)
4. Who developed the first computer language, which eventually becomes known as COBOL.
5. The company where William Shockley, John Bardeen and Walter Brattain invented the transistor.
6. One of the programmers from IBM of FORTRAN programming language.
7. One of the developers of the Google search engine at Stanford University.

Down

1. The French inventor of a loom that used punched wooden cards to automatically weave fabric designs. Early computers would use similar punch cards.
2. The German inventor of the Z3 (no, that isn't a car)





Town secretary
My LAST Crossword puzzle on products

May

Guess the 6 ANSYS products Crossword Puzzle

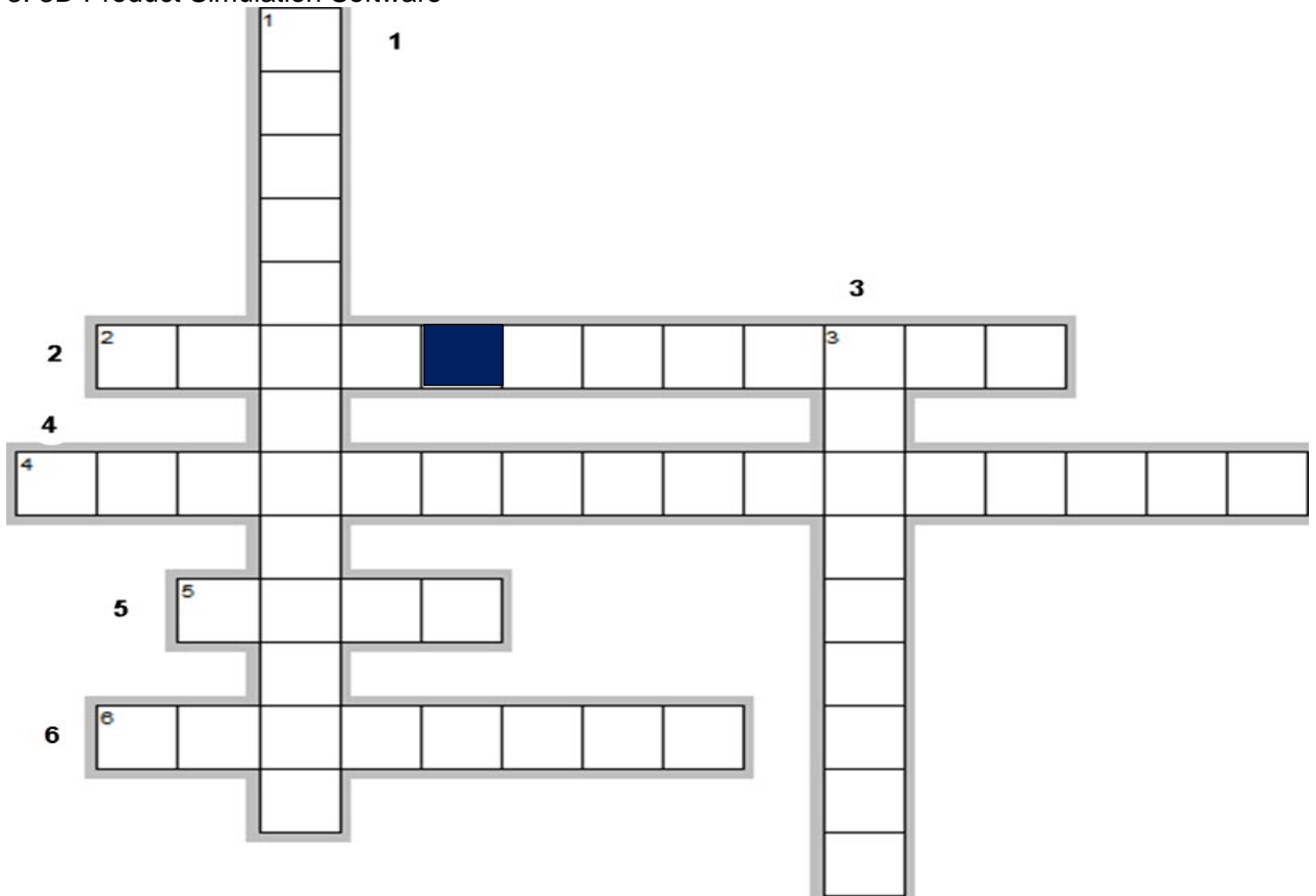
hint: I left off the first word ANSYS. It made my puzzle too long. Now only the product name

Across

- 2. Create and Deploy Digital Twin Models
(blue is a free space between the words – do not use the blue, possible new design)
- 4. Optical Design and Analysis
- 5. 3D High Frequency Simulation Software
- 6. Electromechanical Design

Down

- 1. Simulation for Photonic Components
- 3. 3D Product Simulation Software





RheKen

May

Town investigative reporter

I am AI and live on a small ranch on the outskirts of the town

I use chatGPT for assistance.

Investigate: "Why are the milking cows wearing pink bows?"

The Rancher & the Secretary are arguing IN our movie theater while everyone is yelling QUIET!!

My cousin Ava ran out of the movie theater to call me. Will they give me a free movie ticket?



While Jason was working the concession stand giving out free popcorn he heard arguing. He quickly called Brett.

Brett, the theater manager, called the town police. He explained that an argument was louder than the movie.

Once upon a time, a Rancher lived in the small town of FEANTM. He was known for his cattle and milking cows. He sold milk and baked goods from his store in the town.

One morning The Rancher stood on his porch gazing out on his cow pasture, enjoying the day. Suddenly he yelled, "What the heck are my cows wearing?" To his surprise, every cow had a big pink bow around their neck.

Although the cows looked happy and pretty, The Rancher was upset. He started thinking about who would go into his pasture to put pink bows on his cows. Our Rancher, a thinking man, decided it must be the Secretary. He stormed into the town movie theater. She was seated in the front row watching the movie. Yes, you are correct that they argued in the movie theater!

As the day continued, the town residents heard about the argument and drove by, taking selfies with a cow wearing a bow to post on their social media pages. All the people taking selfies aggravated him to the point that he didn't even want to bake his famous Rhubarb pies to sell. He called the Secretary, and she explained what had happened – the argument was so loud in the theater that he didn't hear what she tried to explain.

The Secretary explained she wanted to show him goodwill. Even though her pie tasted better, she wasn't upset that The Rancher won the baking contest. She decided to help The Rancher organize rotating his milking cows into the different pastures. She explained by putting different colored pink bows on each cow that, she could see from a distance Myrtle, PingPong, Cynthia-Ann, and the others. The Secretary said the bows would help her recognize them. The Rancher thought, who the heck names a cow PingPong, Myrtle, or Cynthia-Ann? The Rancher was still suspicious.

The Rancher didn't say anything. He only answered, "Oh, okay, that makes sense." At the next Town Hall Meeting, while the Secretary was telling the Supervisor about her sorting idea, The Rancher walked up with a big smile and returned all the bows. He turned to the Secretary and said, "I think you should sort your own silverware drawer from now on."

The End – well, at least of putting pink bows on the cows.



Town secretary
My last Crossword puzzle answers

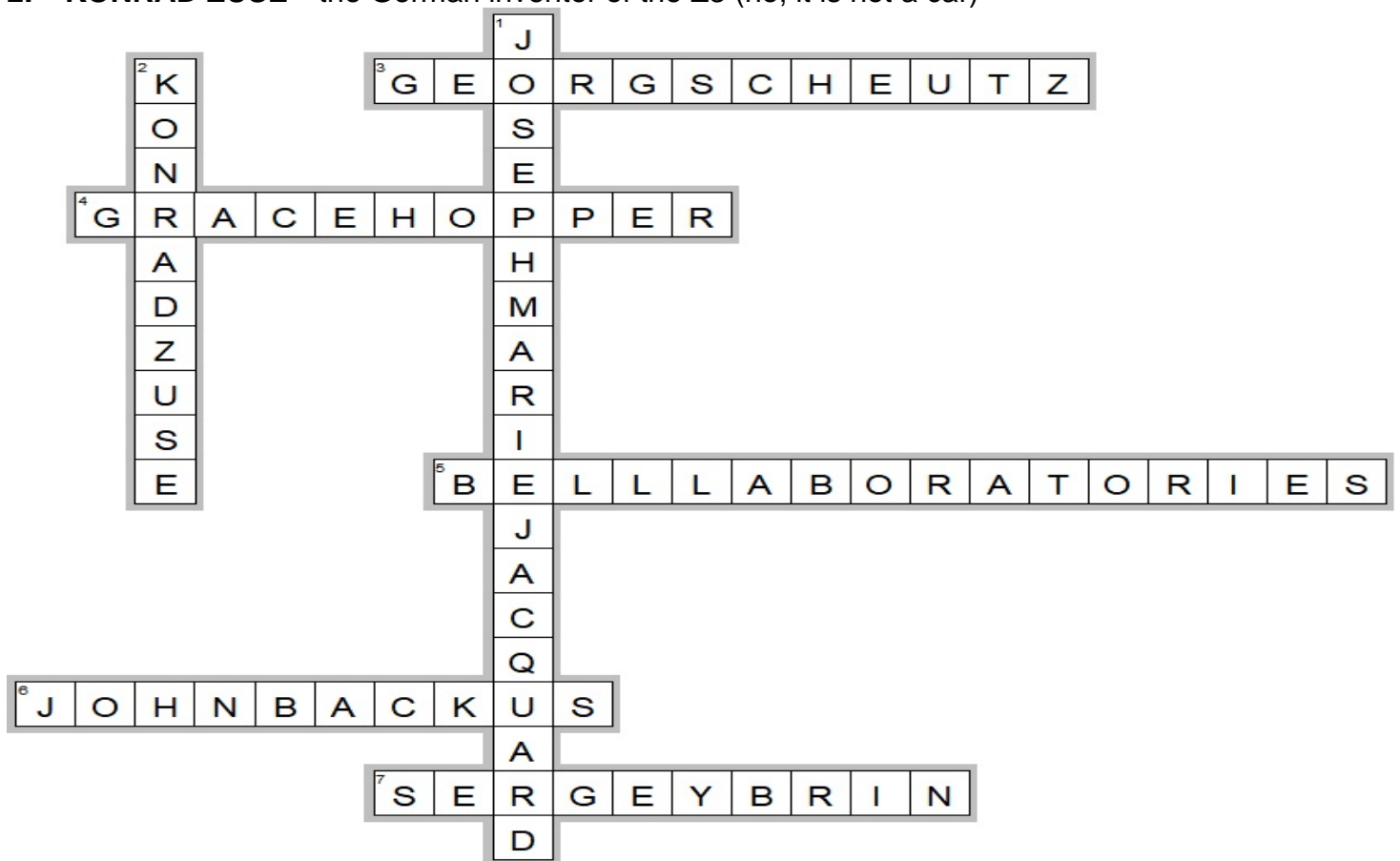
May

Across

3. **GEORG SCHEUTZ**—the Swedish inventor and his son Edvard who design the world's first printing calculator.
4. **GRACE HOPPER**—developed the first computer language, which eventually becomes known as COBOL
5. **BELL LABORATORIES**—Name the company where William Shockley, John Bardeen and Walter Brattain invented the transistor.
6. **JOHN BACKUS**—One of the programmers from IBM of FORTRAN programming language,
7. **SERGEY BRIN**—One of the developers of the Google search engine at Stanford University.

Down

1. **JOSEPH MARIE JACQUARD**—Name the French inventor of a loom that used punched wooden cards to automatically weave fabric designs. Early computers would use similar punch cards.
2. **KONRAD ZUSE**—the German inventor of the Z3 (no, it is not a car)





Goodbye and Come Back Soon



QUIZ Credit - Correct Answers A-C you are served doughnuts!
Correct Answer D you are served Coffee & Doughnuts & Cookies!!!!

- A Boeing AH-64E Apache Guardian**
- B Bell AH-1Z Viper**
- C Eurocopter Tiger**
- D. Our very own town supervisor, Marsha.**
She calls it paper recycling.
She misses the trash can every time and flies them right into the wall.



We will always remember. AND today we thank Boeing for the MH-47 Chinook helicopters and the US special SEAL team

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!

