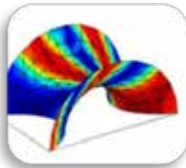### Airport-Leonardo

Library-FNSS

Auto-Ford

Marco - RBF/Univ.TorVergata

Curt - Autodesk

Metin - OZEN Engineering

OZEN Knowledge Base

Madhukar - CADFEM

Carla - Conference

Int'l LS-DYNA User Conf. & Ansys Trans. Summit
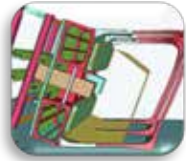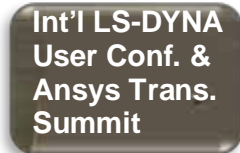
Dan - Altair
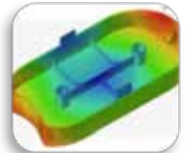
Sabyl - Animal Health - Abaqus

Adam – EDR Medeso

R. Davies Battery Structural Safety Using ANSYS LS-DYNA
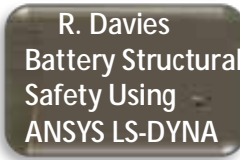
Brianna -LLNL

Bart – LS-DYNA Multiphysics

Abigail - ANSYS Free Course

Marjorie – Edwards AFB

Kensi's Garden - AUTOCAD

Rhea's Hangar - Fighter Pilot

Quinn's Movie – Owl Aero

Movie Pasture

Now Entering the Town Hall Plaza - drive slowly – galloping prohibited

Editors: (alpha order) Anthony, Art, Churchill, Marnie, Marsha, Sabyl, Shweta, Taylor
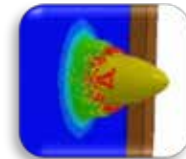**Jr. Editors: Rheannon and Kensington (yes, she likes pink)**
Town Pretend to be Editors:
The Old Rancher   No one in town knows his name. You yell "Hey, Old Rancher."
The Old Pilot   No one in town knows his name. You yell "Hey, Old Pilot."
The Old Racer   No one in town knows his name. You yell "Hey, Old Racer."
They are all brothers - strange family

Contact us at: feaanswer@aol.com   Attribution: Map town graphics are courtesy of vecteezy

Names, & characters of AI visitors, AI editors, or stories are the products of the town imaginations. Any resemblance to actual persons, living or dead, or actual events is purely coincidental.

We will always remember

R & D - Camping - Town Map

Horse Trail ⟶   Yield right of way to horses

R & D Technology
Business Park Plaza

RV CAMPING
Park in any
vacant camping site

Town Hall

Library

CADFEM

DFETECH

OZEN

d3VIEW

Oasys

rescale

ENGINSOFT

Ansys

AUTODESK

Applus⊕ DatapointLabs

Fire & Police Depts.

Lawrence Livermore
National Laboratory

Coffee Shop
News
Marsha & Marnie
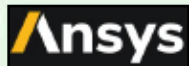
Petting Zoo

Old Rancher

HOSPITAL
Research

rbf

MEDITATE

Auto Race track
& Auto Industry

Rheannon's
Aerospace Hangar

Kensington's
Garden

Quinn's Movie
Pasture

Elect/Water. &
Sewage Treatment
Plant Facilities

Table of contents

The copyright is reserved by the respective individual or company. The links will provide the URL for information & higher-resolution graphics/videos.

Page 03 Town Map – technology business park, camping and our town – free coffee!

Table of contents

Welcome to our Town Hall Meeting & Announcements

Town Hall Meeting

Park Cars behind building
Park Tractors behind cars
Tie horses to hitching rails

Free coffee & Marzipan & cookies!
The town consists of individuals who are passionate about finding solutions, as well as caring about animals and children.

Town Gossip is at the local coffee shop.
Pets are welcome. Horses, pet goats stay outside.

First - dragon, garden, drive-in movie. Why did I authorize them? Without imagination, many ideas, simulations, medical cures, & creativity would not come to life. The creation of our town is born from trying. If it doesn't work, then you learn & try again. You will succeed if you learn & try.
(See RheKen and the valuable lesson – Never Give Up)

Why do you need to support your local fire department?
Picture this: a pasture fire, over the hill, heading my way. I never realized how fast fire moves. Thanks to the great work of firefighters, we didn't have to evacuate. Yes, I had my N95 mask on & was taking pictures while running to the horse barn to move horses. Yes, my husband was yelling, "Now isn't the time for taking pictures!!!"   **Support your Fire Fighters!**

Our town is proud of MeDiTATe. Resident Announcement:
YouTube **MeDiTATe-project final video** "We are thrilled to announce the release of a new video showcasing the results of the **MeDiTATe project, as it nears completion**. The video shows how MeDiTATe is revolutionizing personalized cardiovascular care & the achievements of the 14 Early Stage Researchers."

Article:
Answers to your Ansys software questions. The Ozen Engineering Knowledgebase. Solutions to some of our most common software support requests.

Article:
CADFEM calculated a bus overturning scenario for Dutch Amphibious Transport Vehicles B.V. using Ansys LS-DYNA according to the ECE R66 regulations for approval by the RDW.

Article:
Rich Davies, Sr. application engineer, EDR Medeso UK, has a webinar on YouTube Ensuring Battery Structural Safety Using ANSYS LS-DYNA

Article:
Advanced RBF Methods for Mapping Aerodynamic Loads onto Structures in High-Fidelity FSI Simulations

> **I found a paper I discussed with my neighbor. My neighbor has plaque in his artery. He showed me the scan and I included it.**
>
> **Quote from Dynas+EP website:** "If you're in the medical device industry, seeking to leverage advanced finite element modeling in stent design, or researching cardiovascular treatments, this paper by Dynas+ Engineering Products utilizing DEP MeshWorks offers invaluable insights"

Dynas+ Engineering Products: "A Technical Centre of DEP MeshWorks for the European territory. This scientific paper delves into an efficient stent finite element (FE) modeling and parametric optimization method, employing DEP MeshWorks' cutting-edge stent rolling and parametric tool, along with renowned LS-DYNA and LS-OPT optimization tools.

DEP Europe - PDF - [Multi-objective optimization approach for biomedical stent using parametric optimization of DEP MeshWorks software](#) -12th EU LS-DYNA Conf. 2019

Authors: Perumal Balu, Amarnath Venkata Golosu
           (Detroit Engineered Products)
         Matthieu Seulin
           (Dynas+ Engineering Products)

Abstract: **Stent deployment for cardiovascular disease treatments is a multifaceted process that demands precision in terms of final stent diameters, minimalistic plastic strain, and fatigue life.** The balancing act between achieving an exact dilation diameter and controlling plastic strain values is contingent on various factors such as stent geometry design, cross-section, material, crimping, and expansion diameter.

The study extends to integration with ABAQUS and I-SIGHT as well. Through a Design of Experiments (DOE) approach, controllable design and deployment process parameters are meticulously explored, allowing for optimum random sampling. The robust parametric tool facilitates the generation of innovative designs, which are subsequently analyzed and optimized using LS-DYNA's explicit solver. The final result is a high-performing, optimized stent design that fulfills the stringent diameter criteria without exceeding minimal plastic strain limits, and also complies with foreshortening and flexibility constraints.

Excerpt Introduction: The main cause of coronary artery disease is an excessive buildup of plaque which obstructs regular blood flow in the artery. It can be treated by implanting a tiny wire mesh tube called a stent at the obstruction location….
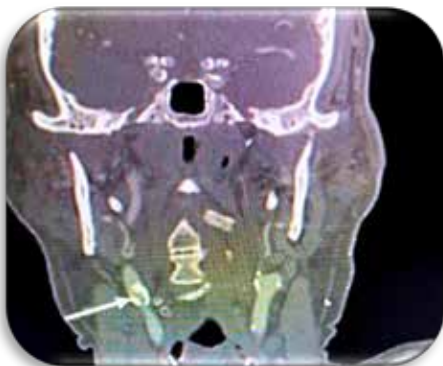
NOTE: The scan is not from the published paper.

The scan is courtesy of a town resident (85 years of age) for publication use to see an underdeveloped artery with plaque.

The arrow is pointing in the scan to the plaque build-up in the artery.

This free Ansys Innovation course is interesting. I like that I'll receive a course completion badge upon successful completion, so I'm going to register.

The website says, "Forced convection is a critical phenomenon in many engineering applications involving heat and mass transfer. The fluids are forced to flow through pipes and ducts to accomplish the desired transfer of thermal energy. For such applications the friction at the walls creates the pressure drop across the flow and the thermal convection governs the overall heat transfer."

ANSYS - Website - Fluids - Ansys Course
[**ANSYS Innovation Course - How Heat Exchangers Work**](#)

Course Cost: FREE
Course Duration: 4-6 HOURS
Skill Level: Intermediate
Skills Gained: Internal Forced Convection, Heat Exchangers,
Ansys Fluent

In this course, they will start with the analysis of velocity and thermal fields in internal flows. Then they will investigate general heat transfer analysis in internal flows and discuss various laminar and turbulent pipe flow correlations. Lastly, introduce different types of heat exchangers and learn how to do design and performance analysis.

A course completion badge allows you to showcase your success. We partner with Credly's Acclaim platform, and digital badges can be used in email signatures, digital resumes and social media sites. The digital image contains verified metadata that describes your participation in our course and the topics and skills that were covered. This badge is for successfully completing the How Heat Exchangers Work course.

How Heat Exchangers Work

Lesson 1	Basics of Internal Forced Convection
Lesson 2	Internal Convection: Correlations and Enhancements
Lesson 3	Intro to Heat Exchangers
Lesson 4	Heat Exchanger Analysis: Design and Performance
	Simulation Examples, Homework and Quizzes

EXCERPT:
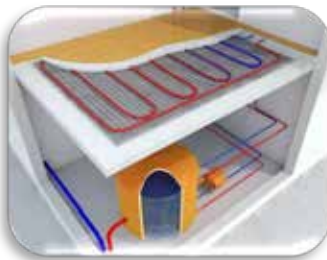
How Heat Exchangers Work Basics of Internal Forced Convection - Lesson 1

Do you like to keep your feet warm during a cold winter? A radiant floor heating system could be the solution! A hydronic radiant heating system uses hot water passing through tubes under the floor to heat it up, so that the floor can radiate its heat and keep the room, and your feet, warm.

The water inside the tubes transfers heat to the floor through internal forced convection. The water temperature can drop several degrees during the process.

To properly design these systems, we must know the temperature drop so that we can estimate how much energy we would need to heat the water back to its initial temperature. In this lesson, we will explore the basics and learn how to perform a thermal analysis for internal flows.

R. Davies
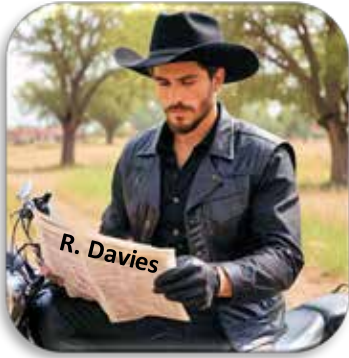
EDR Medeso has a webinar I found on YouTube that's quite interesting. I want to share it with you. It has technical explanations and needed information.

- The webinar is approximately 44 minutes.
- Below are a few of the slides.

Ensuring Battery Structural Safety Using ANSYS LS-Dyna

Rich Davies
Senior Application Engineer

EDR Medeso – YouTube

**Ensuring Battery Structural Safety
Using ANSYS LS-DYNA**

Rich Davies
Senior application engineer, EDR Medeso in the UK.

Introduction

Engineering Goals
- Ensure structural integrity of batteries
- Enable robust design to prevent thermal runaway

Solution
- Explicit structural solver for drop/crash test
- Seamless integration with thermal, electromagnetic solvers for the Joule heating effect
- Availability of battery thermal abuse models
- Common FE model across physics in a single interface

Benefits
- Seamless data transfer between solvers (estimated 3x time saving)
- Virtual testing for cost and time reduction to ensure safe operation of battery packs
- Improved, and informed, structural design to demonstrate compliance with safety regulations

Internal Shorting Modelling Detail

Thermal Abuse - Simulation

Pre-Internal Shorts

Internal Shorts

Thermal Runaway

Section view of temp. distribution

Cell's in-plane and through-thickness thermal conductivities

During internal shorts, cell stays stable for a while
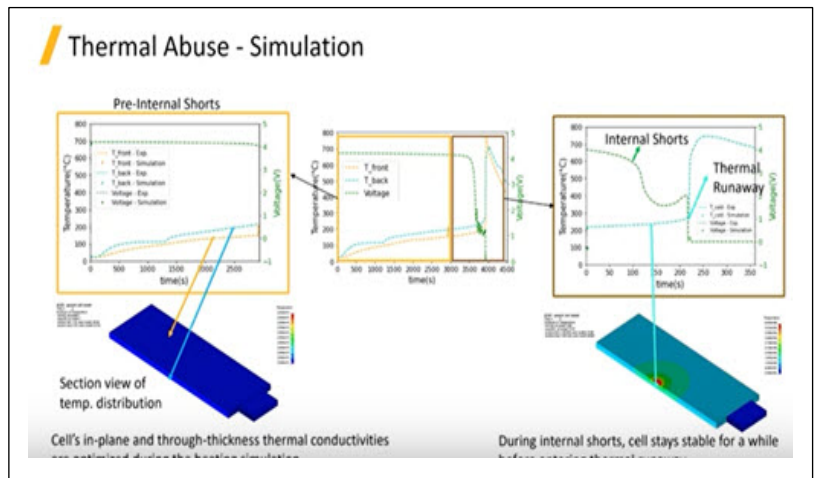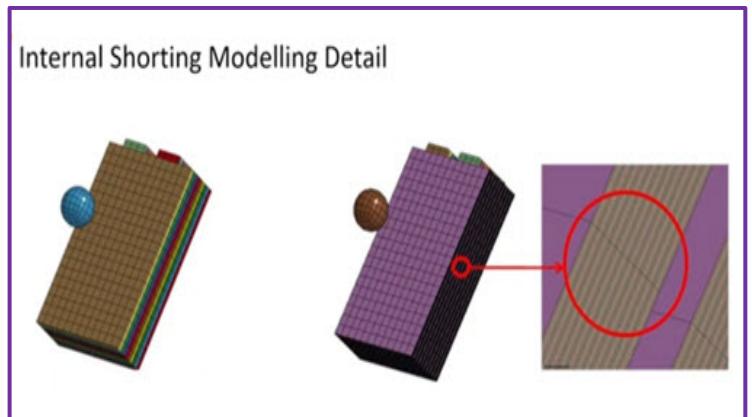
Thanks to Marco Evangelos Biancolini and Philipp Mucha** for bringing this to my attention on LinkedIn.

I want to let you know that there are extremely interesting lectures on YouTube of a CFD Course project.   It is a channel by Professor Milovan Peric and sponsored by Siemens. Professor Milovan additionally has a published book you should know about and read - Computational Methods for Fluid Dynamics.

Based on:

Joel H. Ferziger
Milovan Peric
Robert L. Street

Computational Methods for Fluid Dynamics

Fourth Edition

**YouTube Channel of
 Professor Milovan Peric.**

Among the lectures you will find:
8. Advanced (Higher-Order) Finite-Volume
    Methods for Computational Fluid
    Dynamics (CFD)

9. Examples of Application of 2nd &
    4th-Order Finite-Volume Methods
    Solving 2D Transport Equations

10. Introduction to solution methods for
     linear algebraic equation systems
     in CFD

Sponsored by:

SIEMENS

Presented by:

Milovan Perić
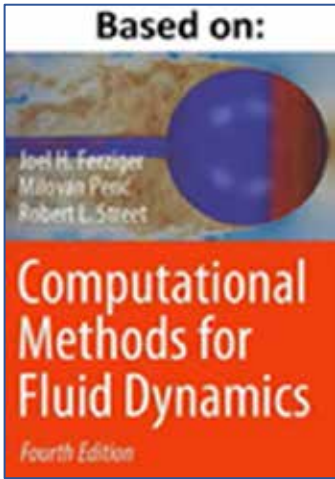
11. Advanced solution methods for linear algebraic equation systems in CFD.

In this lecture the under-relaxation approach is described first. Its aim is to promote the convergence of outer iterations when solving non-linear and coupled equation systems, but it is also important when deferred correction approach is used in conjunction with discretization methods of a high order. Because it modifies the linear algebraic equation system and thus influences also the performance of linear equation solvers, the under-relaxation approach which is widely used in CFD is described first.

Conjugate-gradient types of solvers are then briefly described. The mathematics behind these methods is too complex for most engineers (including myself), so the algorithms for three solvers are described without derivation. Two of these methods – one for symmetric and one for non-symmetric coefficient matrixes – will be tested in the next lecture and the codes will be available in source form in supplementary material for Lecture 12.

Finally, multigrid approach is described in more detail. It can be applied to accelerate any iterative solver, which will be demonstrated in the next lecture.

Please visit his YouTube Channel for the links to:
   · Download the video, the transcript of its soundtrack, and the PowerPoint presentation file
   · You are also encouraged to participate in the discussion by posting comments, questions, and suggestions for improvements in the dedicated space for "The Perić Lectures on CFD"

Monthly simulation choice. Harris was eager to share his target practice video from the gun range with me. I responded with a smile, "I have a simulation in mind that you'll appreciate - it's an excellent opportunity to watch, learn, and improve."
LS-DYNA Multiphysics channel on YouTube.

YouTube - LS-DYNA SPH: Impact on aluminum plates

SPH simulation of a rigid projectile impacting an aluminum plate at different angles and velocities.

The structure response of a concrete wall subject to the combined blast and fragmentation impact loading from a cylindrical shaped charge is simulated using Particle Blast Method (PBM).
ADAPTIVITE_SOLID_TO_SPH is used to transfer eroded concrete element to SPH element.
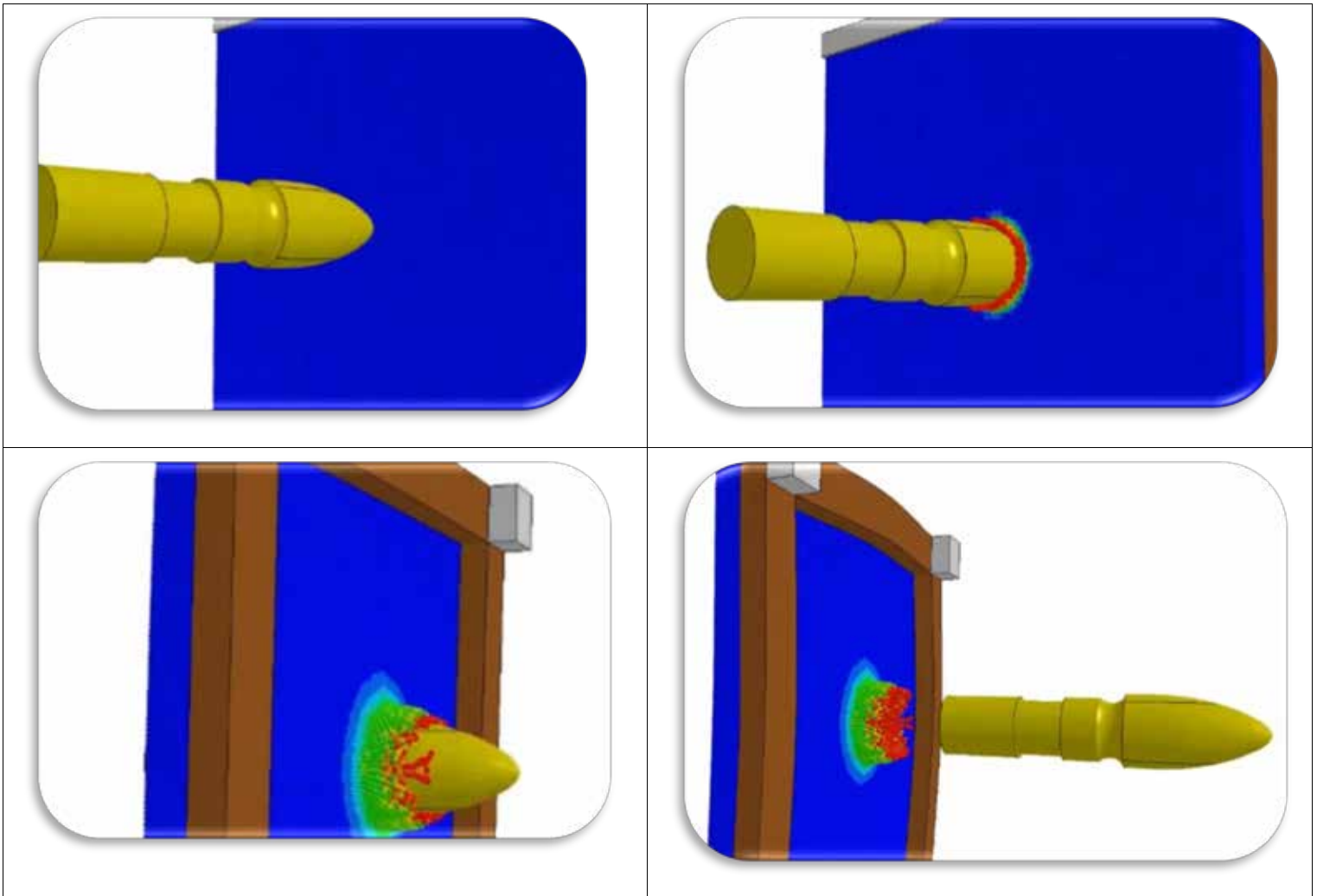
Livermore, CA - LLNL - Excerpts - In a milestone for supercomputing-aided drug design, Lawrence Livermore National Laboratory and BridgeBio Oncology Therapeutics today announced clinical trials have begun for a first-in-class medication that targets specific genetic mutations implicated in many types of cancer. The drug discovery work was powered by LLNL supercomputers Ruby (shown), Quartz and Lassen. Graphic by Amanda Levasseur.
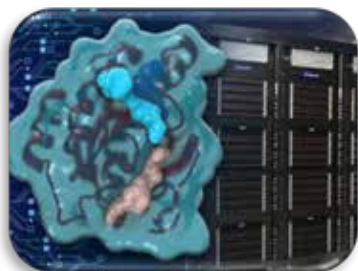
LLNL - Website - [LLNL and BridgeBio announce trials for supercomputing-discovered cancer drug](#) **(Jeremy Thomas)** In a substantial milestone for supercomputing-aided drug design, Lawrence Livermore National Laboratory (LLNL) and BridgeBio Oncology Therapeutics (BridgeBio) today announced clinical trials have begun for a first-in-class medication that targets specific genetic mutations implicated in many types of cancer.

The development of the new drug — BBO-8520 — is the result of collaboration among LLNL, BridgeBio and the National Cancer Institute (NCI)'s RAS Initiative at the
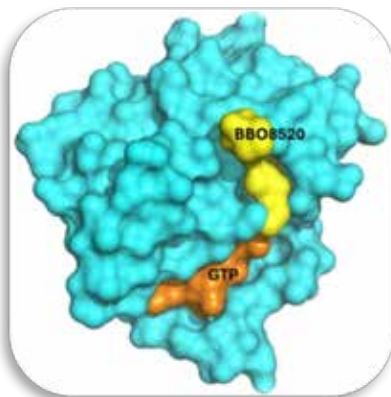
This image depicts a surface representation of the interaction among the cancer drug candidate, BBO-8520 (yellow), the natural substrate guanosine triphosphate (or GTP, orange) and a KRAS protein (cyan). Image by LLNL team.

Frederick National Laboratory for Cancer Research (FNL). In a first for a Department of Energy (DOE) national laboratory, the drug was discovered through DOE's leadership in high performance computing (HPC) for mission applications, combined with an LLNL-developed platform integrating artificial intelligence (AI) and traditional physics-based drug discovery, and

The drug candidate has shown promise in laboratory testing for inhibiting mutations of KRAS proteins linked to about 30% of all cancers — targets long considered "undruggable" by cancer researchers. The achievement provides hope for broad impact on cancer patients whose tumors harbor susceptible KRAS mutations. This indicates that a computational/AI drug design approach could unlock new insights into the disease and the future of cancer treatment.

"For the DOE complex, this is the first true example that high performance computing can accelerate drug discovery, which is reinforced by making it to human trials," said LLNL Biochemical and Biophysical Systems Group Leader Felice Lightstone, principal investigator for the project. "Passing FDA clearance to get to human trials already says that the FDA has looked at the design, and we've met all the criteria to have a real-world application. Not only that, but we're taking our basic research in high performance computing and converting it to an application that industry can find useful — this is a true milestone."

[YouTube Video](#)

After just three years of development, thanks to a legacy of scientific expertise in small-molecule research, LLNL's unparalleled HPC capabilities and the Livermore Computer-Aided Drug Discovery (LCADD) platform,

the U.S. Food and Drug Administration (FDA) cleared BBO-8520 for human trials in December 2023. The trial will focus on patients with KRASG12C mutant non-small cell lung cancer and will test the novel inhibitor for safety and efficacy.

The milestone leverages computational drug design capabilities originally motivated by a longstanding DOE-NCI partnership under the Cancer Moonshot, which aims to apply world-class computing resources at LLNL and other DOE national laboratories to advance cancer research and treatment for the public good. Researchers on the project said the partnership's success in developing a tangible drug candidate underscores the value of uniting expertise from the DOE national laboratories, biomedical research institutions and innovative companies to solve difficult challenges such as cancer. It also indicates the computational approach could save millions of dollars and valuable time — perhaps years — over the traditional drug discovery process, where even promising compounds can fail before reaching human testing.

"Through our collaboration with LLNL and FNL, we've reached a significant achievement in drug discovery for inhibiting KRAS mutations that lead to cancer," said BridgeBio Oncology Therapeutics Chief Science Officer Pedro Beltran. "The development of BBO-8520 could only have been possible through our partnership approach and exemplifies the power of teamwork and innovation. This drug was able to reach human trials in record time and epitomizes the potential of computational and AI-enabled drug design to save time, money and lab resources on new drug discovery. It's a testament to the bright future of our collaboration and the hope it can bring to patients in need. We are proud to continue working alongside LLNL and FNL to push the boundaries of what's possible in cancer research."

In addition to advancing cancer research, LLNL representatives said the milestone is validation that integrating supercomputing with AI- and physics-based computational platforms has the potential to further accelerate small-molecule drug discovery and equip DOE, the National Nuclear Security Administration and LLNL with the ability to quickly and routinely develop medical countermeasures for disease or future pandemics, aligning with broader mission focus areas in biosecurity, bio-resilience and national security.

"Through this pioneering partnership, LLNL, the Frederick National Laboratory for Cancer Research and BridgeBio have unlocked a beacon of optimism in the fight against cancer — and this is only the beginning of what we hope will be a long and fruitful collaboration," said Pat Falcone, deputy director for science and technology at LLNL. "This rapid journey from computational simulations to human trials for this drug reflects the transformative power of research at the DOE national laboratories and ensures we are better-prepared for the next pandemic. This collaboration stands as a testament to the potential of public-private partnerships, and we invite other institutions and companies to join us in the pursuit of innovative solutions through computational and AI-aided drug design. Together, we have accelerated the pace of discovery."

Initial research and funding for the work came from the RAS Initiative, established by NCI to explore novel approaches to attack proteins encoded by mutant forms of RAS genes and to ultimately create effective, new therapies for RAS-related cancers. Among all forms of RAS proteins, KRAS is the most desired target for therapeutic treatment because of the prevalence of mutant (oncogenic) KRAS in pancreatic, lung and colorectal cancer, researchers said. Mutations of the RAS family of genes are implicated in 20-30 percent of all cancers — including 95% of pancreatic cancers and 45% of colorectal cancers.

"The Frederick National Laboratory's longstanding relationships with our colleagues at Lawrence Livermore through the NCI-DOE collaboration set the stage for this public-private partnership with BridgeBio, which represents a distinct model for drug development that encompasses world-class computing capabilities," said Dwight Nissley, cancer biologist and head of the RAS Initiative team at FNL. "By leveraging each partner's unique strengths, we realized a long-standing goal of the NCI, to develop novel therapeutic options for RAS-driven cancers."

Normally, RAS proteins receive and follow signals to switch between active and inactive states. Like a light switch, mutated RAS proteins such as KRASG12C can become stuck in an "always-on" state that causes cells to grow out of control; forming tumors and the cancer itself to spread to other parts of the body. While existing drug treatments aim to turn this switch off, cancerous cells sometimes still find ways to turn it back on again — making the treatments less effective over time. Unlike most current KRASG12C drugs, BBO-8520 targets KRASG12C in both its active and inactive states, effectively blocking its function and hindering cancer progression. This dual mechanism is believed to offer advantages over existing therapies by addressing some mechanisms of resistance that can develop over time.

Preclinical studies demonstrated promising results for BBO-8520, showing statistically significant inhibition of tumor growth in various cancer models, even in cases where resistance has emerged against other medications targeting the same protein. By binding only to the "off" conformation, existing treatments "result in a patient developing resistance quite quickly," resulting in cancer progression, said Anna Maciag, a cancer biochemist who led the FNL's preclinical work on BBO-8520. "This dual inhibitor hits the 'on' and 'off' states simultaneously, providing 100% coverage of the target," Maciag added.

The studies suggest that BBO-8520 has the potential to be more effective in treating certain types of cancer, particularly those driven by mutations in the KRASG12C gene, which plays a critical role in cancer cell growth and proliferation and, for decades, has been considered undruggable by the scientific community.

While a typical drug-discovery program synthesizes many thousands of promising compounds to design and develop a drug, the team behind this research initially synthesized only a few hundred compounds to discover BBO-8520 — using the AI- and physics-based LCADD platform to narrow down the number of possible successful small molecules for synthesis. With thousands of compounds modeled in silico, the team synthesized about 850 compounds for the entire project.

The joint effort stems from Cooperative Research and Development Agreements (CRADAs) between LLNL and BridgeBio Oncology Therapeutics and between BridgeBio and FNL, aimed at advancing discovery of novel RAS inhibitors for the treatment of cancer. The CRADAs brought the three institutions together to tackle the most challenging aspects of cancer therapy: the long timeframe to bring a drug to market and the high rate of failure for promising drug candidates. LLNL also saw the problem as an important use case for advanced computing. In the coming years, LLNL and BridgeBio will continue to seek new compounds for other targets identified by the RAS Initiative, experimentally testing and validating these compounds, analyzing interactions between compounds and targets and optimizing existing compounds.

"This is a prime example of a truly collaborative spirit with a shared vision: to develop innovative therapies that target RAS-driven cancers with precision and efficacy to give new hope to cancer patients," said LLNL's Yue Yang, a computational chemist and a lead researcher on the project. "We want to thank BridgeBio for trusting us to become part of their team and to have an impact on future candidates as well as their ongoing drug-discovery efforts. BridgeBio's willingness to integrate us with their plans was key to the success of this drug."

Yang added that the LCADD platform used to discover BBO-8520 is broad and customizable to a wide range of ailments, including other forms of cancer and infectious disease. By collaborating with U.S. industry, scientists could test and improve the platform to combat future biological threats with the assurance of a validated system.

LLNL Innovation and Partnerships Office (IPO) Business Development Executive Yash Vaishnav negotiated the CRADA with BridgeBio subsidiary Theras, as well as the license agreement for the drug candidate with BridgeBio Oncology Therapeutics. Vaishnav also manages the intellectual property portfolio of KRAS inhibitors developed under the CRADA and the relationship with his counterparts at BridgeBio. IPO is the focal point for LLNL's engagement with industry and aims to accelerate U.S. competitiveness by identifying new economic opportunities and solutions and transferring those to the private sector through licensing or partnerships.

**Do you realize we only have 3 months until the Int'l LS-DYNA Conference.
Be there, or be square (My Mother's old fashion expression)**

The LS-DYNA conference will bring technical information to my engineering community and feature insights, collaborations, and cutting-edge technology in my home state of Michigan.

Get ready now! We are closing in on the time to be in Metro Detroit on Oct. 22 - 23, 2024

ANSYS - Website [All LS-DYNA Users plan to meet in Plymouth, Michigan.](#)

International LS-DYNA User Conference and Ansys Transportation Summit

**Saint Johns' Resort - 44045 Five Mile Rd
Plymouth, MI 48170**

A 200-acre iconic landmark
Surrounded by natural beauty.

Key Dates and Deadlines

·   Paper Acceptance Notification | July 1, 2024
·   **Final Paper & Presentation Due | September 31, 2024**

Additional Presenter Information

·   Submissions will be reviewed and approved according to the following criteria: Technical innovation, scientific rigor, relevance to LS-DYNA community, meaningful conclusions and more.
·   All papers will need to be accompanied by a presentation.
·   Presenters will be assigned to a 30-minute timeslot:
    o   20 minutes for presenting
    o   5-10 minutes for Q&A.
·   Recorded presentations may be considered if you are unable to attend in-person.

From the EnginSoft Expertise website: The Virtual Optimization PAsta production process (OPAV) research project, which resulted in a simulation model.

Pasta production is no different from any other automated or semi-automated production system in that it is performed through a chain of automated operations all working in sequence.

Enginesoft - Website - Integrated Simulation of Commercial Pasta Manufacturing

Abstract - This study was part of the Virtual Optimization PAsta production process (OPAV) research project, which resulted in a simulation model that could be used by industrial pasta manufacturers to help them improve the quality and production process of their pasta.

The model created allows the user to adjust rheological, mechanical and technological parameters that are peculiar to the pasta production process in order to optimize the characteristic of the final pasta production.

The Industrial Pasta Manufacturing Process - Pasta is produced by mixing milled wheat, water and other optional ingredients to create the dough. Most modern pasta presses are equipped with a vacuum chamber that removes air bubbles from the pasta dough before extrusion takes place. If this process fails, small bubbles will form inside the pasta reducing the quality of the finished product by diminishing its mechanical strength and giving the product a white, chalky appearance.

The dough is then kneaded and moved directly to the extrusion phase where a high-capacity auger extruder, equipped with a variety of dies that determine the shape of the pasta, produces the pasta shapes. The auger fits into a grooved extrusion barrel and moves the dough to the extrusion phase generating a great deal of heat due to pressure and frictional forces. In order to dissipate this heat, the extrusion barrels are equipped with a water cooling jacket

After the extrusion phase, pasta is dried. During the drying process, the moisture in the pasta is reduced from approximately 31% to 12-13%.

The finished product is thus hard and able to retain its shape and be stored without spoiling.

Finally, the pasta is packaged.

Virtual Simulation of the Pasta Making Process - The scope of this work was to simulate the entire pasta production process, in particular we:

- **studied** the rheological aspects of the ingredients to verify the dough's dependence on various parameters such as temperature, wheat milling and water
- **simulated** the entire mixing/extruding process to obtain the best quality and appearance of the pasta
- **ensured** that the flow rate of the dough through the extruder and the die remains uniform throughout the process. Variances in the flow rate will cause pasta to be extruded at different rates and produce pasta that is non-uniform in size resulting in increased costs to the process since that pasta must either be reprocessed or discarded
- **reproduced** the working pressure of the extruder which allowed us to perform a structural FEM analysis in order to verify stresses and deformations on the extruder and die
- **virtually optimized** the extruder and die shape to limit the recirculation of the dough. "Dead" zones in the flow cause local solidification of the dough with the consequence of higher maintenance costs and a low quality finished product
- **simulated the drying cycle** to control the time, temperature, moisture content, and the final hardness and shape of the pasta. In this phase it is important to ensure that the pasta pieces do not stick together and to control the moisture gradients from the surface to the interior of the pasta. If the past dries to fast it will crack on the other hand if the drying is too slow it will spoil and form mold before it dries

All of the single phases in the process were studied, simulated and optimized within an optimization framework. A physical test was carried out at a pasta factory for each phase to validate the simulation model built.

The resulting simulation model, which uses a combination of features from modeFRONTIER, ANSYS, LS-DYNA, CFX and Magma, provides a simulation environment that can be customized to fit the specific needs of any pasta manufacturer.

Autodesk – From the CSUN website, "Autodesk Technology Engagement Center - Welcome to the Autodesk Technology Engagement Center (ATEC), a new beacon of innovation and transformation at CSUN. Positioned at the forefront, ATEC is an upcoming state-of-the-art facility dedicated to bridging the equity gap in STEM education and inspiring underrepresented minorities to pursue careers in Science, Technology, Engineering, Arts, Humanities, and Mathematics (STEAHM)."

Information on the website:
  · ATEC Construction live feed
  · ATEC Groundbreaking

CSUN - website - [Autodesk Technology Engagement Center](#) Discover how we're pioneering new and inventive ways for students across CSUN's campus to become more engaged with their academic programs. **About the Center** - … this 32,000-square-foot facility is poised to open its doors in the fall of 2024, conveniently located near Jacaranda Hall. Inside, it will house state-of-the-art research facilities and dedicated spaces for design, digital capture, and fabrication. Equipped with these cutting-edge tools and laboratories, students and faculty will find it significantly easier to collaborate on interdisciplinary research projects while enhancing their educational capabilities.

Watch Autodesk CEO Andrew Anagnost and Dean Houssam Toutanji as they share their excitement about the upcoming Autodesk Technology Engagement Center, and how this groundbreaking facility will transform engineering education, inspire students to push the boundaries of current technology, and empower the next generation of innovators….

A Brief History - Autodesk's involvement in this initiative traces back to two years ago when it initially supported what was known as the Center for Integrated Design and Advanced Manufacturing at CSUN, affectionately termed the "Center of Possibilities" by university officials. With substantial support from California Governor Gavin Newsom, and thanks to the tireless efforts of U.S. Senator Alex Padilla, Assemblywoman Luz Rivas, and Congressman Tony Cardenas, this public-private partnership has blossomed into a $25 million project that will bring the community, educational partners spanning from preschool to college, and innovative educational pathways together.

Excerpts from Among the Labs: High Bay Structural Test Lab - Machine and Testing Lab - Design Digital/Capture/Augmented Reality Lab -   Emerging Advanced Materials Labs - Makerspace and Discovery Lab - Incubator Project Research Lab

The Fabrication Lab will provide an innovative space for students and faculty to experiment with emerging fabrication techniques. By having access to 3D modeling tools like AutoCAD, SolidWorks and Fusion 360 on dedicated computers, researchers and students will be able to bring their creations to life with the latest software along with state-of-the-art 3D printers, resin transfer molding equipment, surface finishing/coating tools, material mixing stations and 3D scanners. With comprehensive digital design and hands-on fabrication capabilities under one roof, this lab empowers the next generation of innovators with an agile infrastructure to rapidly iterate and test concepts firsthand. Here, multi-disciplinary teams can learn through experience, collaboratively exploring and validating ideas that have the potential to shape the future…

From the Altair Website: "One of the challenges manufacturers face today is accelerating design and engineering processes while maintaining accuracy and efficiency throughout the product life cycle. From aerospace and defense to food and beverage production and beyond, it's common for manufacturers to face high production goals and tight timelines. However, solutions to these problems often require too much money; and navigating budgetary matters while focusing on other needs, such as upskilling, can be difficult."

Altair - Website - [Artificial Intelligence in Manufacturing: How to Innovate with Speed](#)

So how can companies optimize output and reach their challenging goals? By improving processes early in the product life cycle by leveraging machine learning and artificial intelligence (AI) in manufacturing.

Why Use AI in Manufacturing Simulation? Recent advances in AI and machine learning, together with supplementary numerical physics-based simulations, can usher in a new era of product design.

Organizations worldwide are integrating machine learning and AI in manufacturing to create efficiencies and address challenges like reducing downtime and optimizing accuracy, production processes, and decision-making. With them, manufacturers can test different strategies virtually, reducing the need for physical prototypes and minimizing the costs and time associated with trial and error. AI-driven simulations enable real-time adjustment – making designs more responsive to changing demands – and allow users to take these results and validate their final designs.

For example, Altair® physicsAI™ helps manufacturers make physics predictions faster. This tool addresses a critical gap in the initial stages of the manufacturing product life cycle, specifically early when various designs are being considered before there's a need to rerun simulations. physicsAI leverages the massive amount of synthetic data manufacturers generate; from there, users can input their CAD designs and eliminate the need to conduct new, time-consuming simulations. By leveraging an AI model trained on data from past simulations, users can efficiently obtain precise predictions regarding typical manufacturing processes.

Altair also has various applications Altair® Inspire™, an intuitive, powerful solution that accelerates simulation-driven design throughout the product development life cycle and further integrates AI in manufacturing. When these designs for manufacturing tools are paired with AI-powered solutions like physicsAI, it streamlines and upgrades the entire workflow.

Overcome the Barriers of Entry - A key impediment hindering the broader adoption of AI and machine learning-based simulation is a limited understanding of the advantages it offers compared to traditional simulation. AI- and machine learning-based simulation doesn't replace traditional simulation – instead, it complements the simulation process by leveraging data organizations already have. Thankfully, these impediments are vanishing as manufacturing leaders continue to embrace machine learning and AI in manufacturing.

AI- and machine learning-powered simulation's benefits are impactful and far-reaching. For starters, it gives organizations more flexibility. It can be used within many manufacturing process simulations such as injection molding, polyurethane foaming, metal stamping, and casting.

And AI in manufacturing is becoming more common than you may think. For example, with its modern, geometric deep learning capability, physicsAI identifies the relationship between shape and performance for any physics. Once trained, physicsAI models can deliver predictions up to 1,000x faster than traditional solver simulations, enabling teams to evaluate more concepts and make better design decisions. Straightforward workflows let users select trained models, generate predictions, and assess quality for a range of manufacturing processes.

AI in Action - An example of AI improving the early design process is demonstrated in the use case analyzing the porosity of an industrial actuator housing using a high-pressure die casting process. One of the most common problems affecting the functionality of casting components is porosity. Although it's impossible to achieve zero porosity in the die-casting process, well-planned mold design and process controls can minimize it. In this use case, using Altair® Inspire Cast™ together with physicsAI improved the product design within a much shorter timeframe while maintaining the quality and integrity of the actuator housing unit.
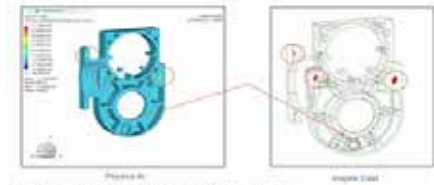
The Importance of AI in Manufacturing - AI in manufacturing is crucial, specifically early in the design process, for optimizing efficiency and precision. For many manufacturing processes, one typically begins with the initial creation of datasets using numerical simulation. With the implementation of AI, once these datasets are determined, users begin training and validating the solver, and using the trained physicsAI model to predict manufacturing defects, reduce design errors and improve the outcome. This structured workflow represents the foundational stages for establishing a methodology integrating Inspire and physicsAI.

Another use case demonstrating the benefits of AI-powered workflows, this time involving Altair® Inspire™ Mold, investigated the warpage of a structural part with ribs using injection molding. Ribs are features added to the primary wall of a plastic part for structural support to resist warpage. In this case, there was a need to run more design models with physicsAI using higher machine learning parameters to achieve a higher degree of accuracy.
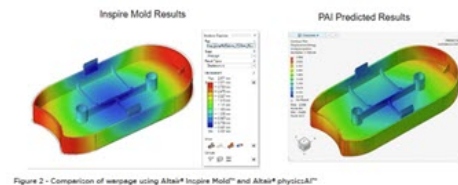
physicsAI utilizes the power of users' CAE data by learning relationships between geometrical shape and full contour results, enabling faster design iterations and generating better designs earlier. Unlike traditional machine learning, physicsAI learns directly from geometry without the need for parameterization.

This means users can learn from previous simulations without the need for design of experiments.

Innovate Faster - Manufacturers are creating, gathering, and retaining massive amounts of data throughout the product life cycle. The strategic use of this data enables manufacturers to drive innovation, improve efficiency, and maintain a competitive edge.

In a data-driven world, it's critical to leverage this information – which is what physicsAI helps organizations do better than any other tool. This tool delivers fast physics predictions by learning from historical simulation data. Although manufacturing processes may vary slightly depending on the product, the logic, and workflow to run physicsAI simulations remain the same.

AI in Action – Again - Another instance of how AI and machine learning accelerates innovation can be found within the metal forming process. For instance, Altair® Inspire™ Form is a complete stamping simulation environment that optimizes designs, simulates robust manufacturing, and reduces material costs. The example below shows a blank size and shape investigated for a typical sheet metal forming process. The size and shape of the blank are crucial for determining the part's formability because they affect the contact surface and friction with the tools. When the test data is more accurate, new design predictions can be made quickly.
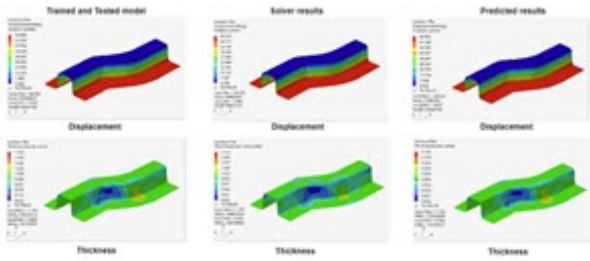
Figure 3 - Comparison of displacement and thickness using Altair® Inspire Form™ and Altair® physicsAI™

Similarly, Altair® Inspire™ PolyFoam predicts and fixes manufacturing problems with rigid and flexible foam product designs earlier in the product life cycle. In another use case showcasing the efficiency of physicsAI and PolyFoam, Altair engineers explored different design variants of a refrigerator door, predicting density distribution and residual stresses.

The results confirmed the reliability and importance of an AI- and machine learning-driven approach.
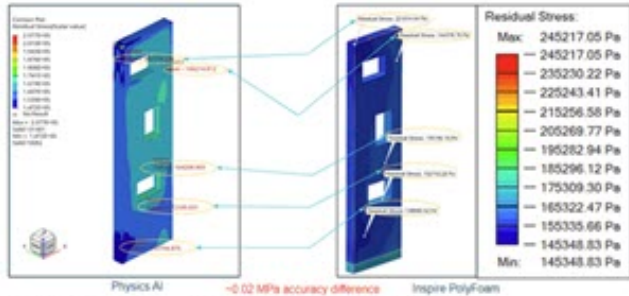
Figure 4 - Comparison of foaming simulation using Altair® Inspire™ PolyFoam and Altair® physicsAI™

This is another example of how AI- and machine-learning powered simulation solutions allow manufacturers to make better product design decisions early and ultimately deliver production-ready tools on time and on budget.

How Should Companies Begin to Adopt AI in Their Manufacturing Processes? Manufacturers don't need to create an FEA model when using AI and machine learning. No matter the application, engineering teams can train a model and within seconds get new design and shape renderings of a particular part and achieve the desired results.

Today, industry leaders around the world are witnessing the positive effect AI has on their manufacturing design processes. For instance, the Delhi, India-based motorcycle and scooter manufacturer Hero MotoCorp Limited – one of the world's largest two-wheeler manufacturers – is reaping the benefits of AI implementation. Jeevesh Prasoon, the company's senior engineer of digital engineering and testing, explains how leveraging physicsAI has helped their CAE engineers. "physicsAI helps to expedite the output prediction, unlike the traditional FEA approach. It gives an output with roughly 90% confidence matrix and over 99% time reduction and hence enables faster design exploration," he said. And Hero MotoCorp Limited is but one of many organizations charting a path forward with AI in manufacturing.

Organizations shouldn't feel intimidated when exploring options for AI in manufacturing. The efficiency and precision AI and machine learning brings to manufacturing processes are valuable. The benefits far outweigh the cost of implementation and optimize product development workflows.

Altair's simulation-driven design tools are developed with both designers and engineers in mind, ensuring ease of use. And through Altair's patented Altair Units licensing system, users get full access to software tools in the Altair One® Marketplace when and how they need them. More design exploration in less time helps companies discover ways to improve designs early in the development cycle so that they can bring innovations to market faster than the competition.

RBF Morph – Did you miss the paper published on open access MDPI? *Advanced RBF Methods for Mapping Aerodynamic Loads onto Structures in High-Fidelity FSI Simulations"* *E*nsuring reliable data transfer is essential for loosely coupling CFD and CSM modules in FSI applications, the RIBES method demonstrates superior balance preservation.

MDPI - Website - [Advanced RBF Methods for Mapping Aerodynamic Loads onto Structures in High-Fidelity FSI Simulations](#)

Andrea Chiappa, Andrea Lopez, and Corrado Groth
Dept. of Enterprise "Mario Lucertini", Univ. of Rome "Tor Vergata" Rome, IT

Left – Fig 2 Excerpts from the paper:

- **(a) ANSYS Fluent solver -** The results, particularly for the pressure field (used for mapping), were compared with those retrieved with the ANSYS Fluent solver (commercial)
- **(b) SU2 CFD solver** - CFD analysis was conducted within the SU2 environment. SU2 CFD solver (open-source) widely used in the aeronautical field.
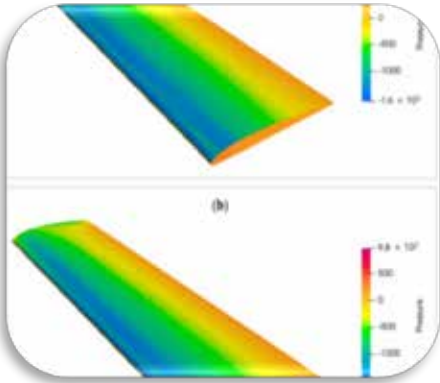
Figure 2. Comparison of the pressure fields for the RIBES wing obtained with Fluent (a) and SU2 (b). The focus of this paper is to compare two data mapping strategies within the context of CFD-CSM data exchange. Both approaches utilize radial basis functions (RBFs) as a crucial component of their algorithms.

Abstract: The reliable exchange of data is a crucial issue for the loose coupling of computational fluid dynamics (CFD) and computational structural mechanics (CSM) modules in fluid–structure interaction (FSI) applications. This paper presents a comparison between two methods for mapping the traction field across mismatching grids, namely the RIBES method and the preCICE algorithm, both based on radial basis function (RBF) interpolation. The two methods demonstrate different degrees of control over balance preservation during mapping, with the RIBES algorithm exhibiting greater efficacy. Test benches are a parametric double curved geometry and a wind tunnel mock-up. In this second case, forces from mapping are used to load a CSM model to retrieve stress and displacement fields. Differences in FEM results are appreciable although not significant, showing a correlation between the accuracy of balance preservation during data mapping and the structural output.

Excerpts -Introduction: The effective and precise combination of computational fluid dynamics (CFD) and computational solid mechanics (CSM) routines is integral to fluid–structure interaction (FSI). Aerodynamic components such as wings, flaps, rudders and stabilizers are characterized by lightweight and flexible structures. Their mechanical behavior and the dynamics of the fluid flow that grazes over them mutually affect each other. Frequently, the flexibility of the structures involved is such that this reciprocal interplay significantly alters the situation from what it would be if the structure were assumed to be rigid. From a scientific and technical perspective, there are numerous examples falling into this category, including wind turbines [1], textile roofs [2], parachutes [3] and both the static and transient [4] dynamics of airplane wings, to name just a few. Examining an aerodynamic component thoroughly requires a comprehensive analysis of the interaction between the two fundamental physics…. The present work focuses on the method employing RBF interpolation. The comparison parameters encompass the criteria for defining a robust and high-quality mapping method. These include load conservation, where force and moment resultants should remain unchanged before and after mapping, with associated vectors aligning in magnitude and direction.

Continued in full with high resolution graphics on MDPI

CADFEM India: Did you know that CADFEM calculated a bus overturning scenario for Dutch Amphibious Transport Vehicles B.V. using Ansys LS-DYNA according to the ECE R66 regulations for approval by the RDW.

(Images: © Dutch Amphibious Transport Vehicles B.V)
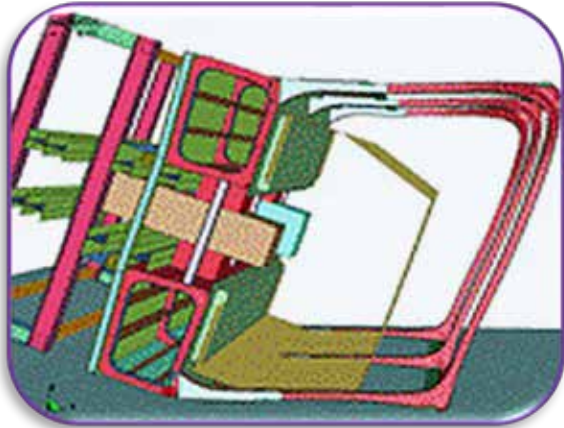
Simulation result of the bus overturn

Real test of the bus overturn.
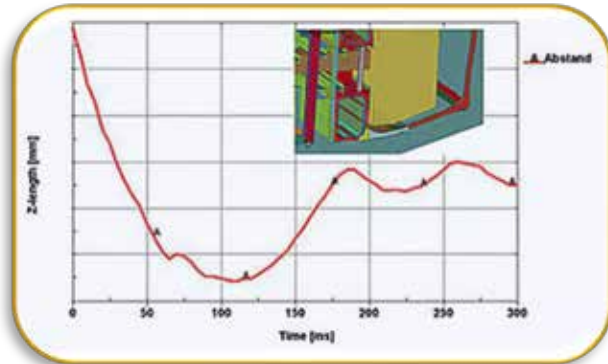
Minimum distance to the survival space in the final variant of the bus

DAT Dutch Amphibious Transport Vehicles B.V

CADFEM – Website - Analysis of an amphibious bus according to ECE R66 regulations

   Sector: Rail vehicle construction

   Specialist field: Structural mechanics

Task - The bus overturn scenario of an amphibious bus was analyzed according to the ECE R66 regulations of the UNECE (United Nations Economic Commission for Europe). The fulfillment of the criteria laid down in the ECE R66 regulations is necessary in order to grant road approval to bus vehicles. In particular, intrusions into the defined survival space of the passengers are not permitted according to the regulations.

Solution - The calculation of the bus overturn was carried out with the Ansys LS-DYNA program and subsequently assessed by the RDW (Rijksdienst voor het Wegverkeer) in the Netherlands. In cooperation with the customer, various design variants were analyzed on the basis of the results of the simulations until compliance with the ECE R66 regulations could be ensured by the simulation. In cooperation with the persons responsible for the design at the customer, the calculations were presented to the RDW and the details were resolved in such a way that certification according to the ECE R66 regulations could take place.

Customer Benefit - By simulating the bus overturn, the number of necessary real tests could be significantly reduced. Based on the calculation results, approval was granted by the RDW. Additional real tests of the entire bus could be dispensed with.

I was discussing adopting another dog with Bart. I found this great story about a Blue Heeler. Bart explained that a Blue Heeler and an Australian Cattle Dog are the same breed. All blue heelers are Australian Cattle Dogs, but not all Australian Cattle Dogs are blue heelers; some are red heelers. They are cautious, obedient, loyal, energetic, protective, brave, and intelligent.

Edwards AFB - The Center of the Aerospace Testing Universe

Edwards - Website - SPAZZ: The Super Service Dog By Kimberley Strong

412th Test Wing - EDWARDS AIR FORCE BASE, Calif.
Photo by: Laura Maples

Kimberly Strong shares how a remarkable dog named SPAZZ became a symbol of hope & inspiration, a testament to the extraordinary capabilities of service dogs & the transformative power of love. Through his unwavering devotion, SPAZZ not only saved Kimberley's life but enriched it in ways she never thought possible.

Once upon a time, there was a remarkable dog named SPAZZ, who became the superhero in the life of Kimberley Strong. SPAZZ wasn't just any ordinary pup; he was a Blue Heeler/Cattle Dog with a story as extraordinary as his abilities. Kimberley's journey with SPAZZ began in April of 2015 when she set out to find a new puppy. Her husband had one condition: it had to be a Blue Heeler/Cattle Dog with a docked tail. Little did they know, fate had something extraordinary in store for them.

After scouring the classifieds, Kimberley stumbled upon an ad for Blue Heeler puppies with docked tails. Without hesitation, she called the number and was directed to a rundown home in Bakersfield. Despite her initial concerns about the breeding conditions, Kimberley found herself face to face with a tiny, sickly puppy. Against her better judgment, she brought him home, naming him SPAZZ.

From the moment SPAZZ entered her life, Kimberley knew he was special. Despite his frailty and early health struggles, SPAZZ defied the odds with Kimberley's love and care. With treatment and dedication, he not only survived but thrived. As SPAZZ grew, so did his bond with Kimberley. He became her constant companion, offering comfort and support through her own battles with epilepsy. Despite her increasing seizures and declining quality of life, SPAZZ remained by her side, a beacon of unwavering loyalty and love.

Then, something miraculous happened. SPAZZ began to exhibit strange behavior just before Kimberley's seizures. With each bark, whine, and paw, he alerted her to an impending episode, giving her precious moments to find safety. It was as if SPAZZ possessed an innate understanding of her condition, a sixth sense that transcended ordinary canine instincts.

Recognizing SPAZZ's remarkable gift, Kimberley embarked on a journey to train him as a service dog. With determination and dedication, they navigated through rigorous training programs, overcoming obstacles and challenges along the way. SPAZZ proved himself time and time again, demonstrating an unparalleled ability to focus and serve Kimberley's needs with unwavering devotion. As SPAZZ matured into a seasoned service dog, he became more than just a pet; he was Kimberley's lifeline. Together, they tackled life's challenges with courage and resilience, forging an unbreakable bond that transcended the boundaries of human and animal.

Today, SPAZZ stands as a symbol of hope and inspiration, a testament to the extraordinary capabilities of service dogs and the transformative power of love. Through his unwavering devotion, SPAZZ not only saved Kimberley's life but enriched it in ways she never thought possible. In the end, Kimberley learned that sometimes, the greatest heroes come in the most unexpected forms. For her, that hero was SPAZZ, the super service dog who changed her life forever.

> **News:** **CADFEM**: (D-A-CH) – I watched a simulation on YouTube from an engineer's perspective.
>
> I think I'll call the Rancher, Secretary, and Rheken. It's time to hang rope swings for the grandchildren to swing on.

YouTube Simulation Episode 4

Nature can be a great designer! And so can you with simulation.

This tree has already survived generations (and it had to endure a lot) and will now also face the generation of our children.

There are many examples from nature from which we can learn. Load transfer, optimal flow and much more. You only have to open your eyes... best you do this with a different perspective...with an engineers perspective!

I read an article by Professor Lonny Thompson of Clemson Univ. he noted that it is free to share, "**Understanding the Path to FEM Mastery: T**he journey to mastering the Finite Element Method (FEM) for a Mechanical Engineer starts with a well-structured foundation to ensure a deep and comprehensive understanding. Here's a guide to prerequisites and topics ideal for learning the FEM."

Building the Foundation for Finite Element Method (FEM) Mastery in Mechanical Engineering
Lonny Thompson, Professor of Mechanical Engineering, Clemson Univ., Anderson, SC, US

Core Prerequisites:

1. **Calculus:**
   - Topics: Limits, derivatives, integrals, multivariable calculus, partial derivatives, multiple integrals, vector calculus, particularly gradient, divergence, and curl, are crucial for dealing with PDEs.
2. **Linear Algebra:**
   - Topics: Matrix operations, vector spaces, eigenvalues and eigenvectors, diagonalization, and linear transformations. Proficiency in matrix operations for effective matrix assembly and manipulation in FEM.
3. **Differential Equations:**
   - Topics: First and higher order differential equations, systems of differential equations.
4. **Engineering Mechanics (Statics and Dynamics):**
   - Topics: Force systems, equilibrium, kinematics, and kinetics of particles and rigid bodies. Provides a solid understanding of the physical principles underlying mechanical systems.
5. **Strength of Materials (Mechanics of Materials):**
   - Topics: Stress and strain, axial loading, torsion, bending, shear, combined loading, stress-strain relationships, and deflection of beams. Key for analyzing material behavior under various load conditions, critical for FEM applications.
6. **Numerical Methods:**
   - Topics: Numerical differentiation and integration. Numerical solution of linear equations, interpolation, basics of numerical linear algebra.
7. **Introduction to Partial Differential Equations:**
   - Topics: Basic concepts of PDEs, boundary, and initial conditions. Lays the groundwork for understanding and solving PDEs, which are pivotal in FEM.

Additional Recommendations:

Basic Programming Skills:
- Languages: MATLAB or Python.
- Reason: Necessary for implementing FEM algorithms for solving computational problems.

Introduction to Continuum Mechanics (if available):
- Focus: Principles of continuum mechanics.
- Benefit: Provides deeper insights into the physical meaning of the equations solved using FEM.

- With these prerequisites, you will have a strong mathematical and engineering foundation to master the Finite Element Method.
- Building this robust knowledge base will enable you to excel in understanding and applying FEM to complex mechanical engineering problems.

Don't forget.   In addition to understanding the Finite Element Method (FEM), practical examples, case studies, experience, and mentorship in practical application are also needed to effectively apply the FEM in finite element analysis (FEA).

OASYS: We'd like to thank Ayrton for sharing this work with us and collaborating with us. Excerpt, "Assessing ground movements caused by various construction activities is of critical importance. Whether it's tunnelling, excavations, or mining works, accurate predictions of ground displacements are essential for ensuring safety, minimizing damage, and optimizing design."

OASYS - PDF - <u>Why taking a digital approach for your Ground Movement Assessment projects is the way</u>

Ground movements occur due to several factors such as construction activities, natural processes, or geological events. Similarly, asset damage assessments focus on evaluating the impact of ground movements on structures, utilities, and other assets. The emergence of computing power and consequently, fast and enhanced software, means engineers are becoming more inclined to take a digital approach to complex, time consuming projects. Structural Engineer at Arup, Ayrton Gill, produced an award-winning research paper exploring the impact of High Speed Two (HS2) construction on the assets that surround Euston Station. With more than 12,000 existing utilities within the HS2 Euston Station site that provide major infrastructure services to the wider London, it proved necessary to check the impact on assets at progressive construction stages. Equally as important as conducting the analysis was clear and exact reporting of the results to the relevant utility providers, so that any potential mitigation works were clearly understood.

Figure 2: Example surface settlement contour plot

With Oasys XDisp being the primary software used to calculate the ground movements and subsequent impact on surrounding utilities following the acceptance criteria for each provider, the paper gives an excellent example of what is achievable when adopting a digital workflow. The paper states, "A digital approach provides an opportunity to improve the quality of work delivered, and often vastly increases time efficiency."

Ayrton outlines the benefits of adopting a digital approach, specifically using robust digital tools like python and XDisp. XDisp is designed specifically for calculating three-dimensional displacements and horizontal strains induced by ground movements. It's an essential tool for engineers carrying out complex Ground Movement Assessments (GMAs). Ayrton explains that the software can generate a comprehensive set of data and analysis, where the user can either use the application itself or call it using the API (Application Programming Interface). This interoperability is imperative for a scalable workflow. The developed python tool as well as using XDisp unlocked the power of automation, freeing up engineer's time to better spend their efforts solving design problems and improving job satisfaction. **PDF contains full graphics & information**
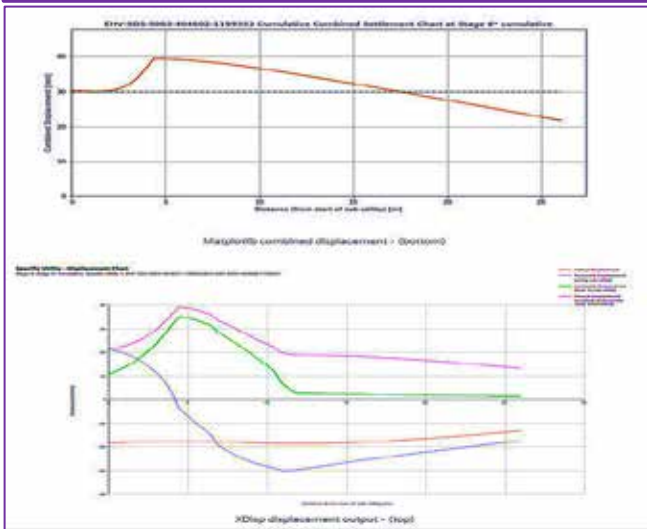
OZEN Engineering: Looking for answers to your Ansys software questions?

Search the Ozen Engineering Knowledgebase for solutions to some of our most common software support requests. And while you are there, feel free to check out some of our other Ansys resources such as our FAQ, blog and video pages.

OZEN - Website - **Ozen Engineering Knowledgebase** with a search box "How can we help you? "
See all Articles For the below headings

Getting Started With Ansys -	**Ansys Installation**	**Ansys Installation and Requirements**	**Licensing**
Ansys Mechanical	**Ansys AEDT**	**Ansys Maxwell**	**Ansys HFSS**
Ansys CFD	**CAD**	**Meshing**	
LS-DYNA & LS-PrePost	**SpaceClaim**	**Ensight Tool**	
Ansys Lumerical	**Zemax**	**Discovery for Modeling Purposes**	**Autodyn**

I heard a few interesting updates about the DYNAmore Nordic conference.

I read, "DYNAmore Nordic - The Nordic Innovation Conference is a sequel to and a continuation of the Nordic LS-DYNA Users' Conf."

ANSYS - Website - The 2024 Nordic Innovation Conference
October 1ˢᵗ - Scandic Göteborg Central , Gothenburg, Sweden

A sequel to and a continuation of the Nordic LS-DYNA Users' Conference. Part of the Innovation Conference will be the traditional Nordic LS-DYNA Users' Conference

At the conference you will gain knowledge in new and exciting software and ways and applications to use the software. It is a conference you shouldn't miss.

This year's event is packed with industry-leading speakers, a top plenary and industry-focused sessions. As always, you don't want to miss the dedicated Ansys LS-DYNA track.

- The Conference aims to celebrate engineering achievements that illuminate what's possible through the use of simulation.
- Discover the tools to optimize processes faster, with greater efficiency.
- Be inspired to design, build, and work in new ways that make your breakthrough ideas reality.

Among the agenda you don't want to miss you will find:

- Recent Development in LS-DYNA
    Thomas Borrvall
- Modelling the mechanical response of Li-ion batteries in electric vehicles
    David Carlstedt, Volvo Cars
- The PTW Dummy, a physical & virtual crash test dummy - a safety system developer's perspective
    Håkan Sundmark, Autoliv
- Calibration and validation process of novel network models for Thermoplastics
    Björn Stoltz, IKEA
- Model-Based Safety-Critical Engineering with SCADE at Saab Surveillance
    Alex Deva, Saab Surveillance
- Going from shells to solids regarding material modelling
    Per-Anders Eggertsen, Volvo Cars
- Crash simulation and testing of child restraint systems at Thule
    Henrik Alm, Thule
- Modelling of composite materials at GKN Aerospace Sweden using Ansys and LS-Dyna
    Dennis Wilhelmsson.

D3View - website - Generic DOE Data Analyzer Workflow now available in d3VIEW

When we have a dataset on hand, it is often of our interest to run a quick analysis and get some insights. The analysis usually includes making predictions of a new dataset, grouping records, identifying important features, and optimization. We can achieve these goals by building a machine learning model and use the trained model to make predictions, cluster analysis, feature important analysis, and optimization. All of these can be easily done with the 012_DOE_DataAnalyzer workflow available for all users.

There are four components of this workflow: 1) Learn and Predict   2) Feature Importance
                                                              3) Optimization   4) Cluster Analysis
Each component will generate a report that contains a summary of the analysis results.

Learn and Predict - On d3VIEW, there are an abundance of machine learning models available for users to explore. An easy way for choosing the model is to select multiple of them and d3VIEW will automatically choose the model that has the best performance. Here is a list of available ML models

Linear Regression	Lasso Regression	Ridge Regression	SVR Regression
Random Forest Regression	Gradient Boost Regression	Gradient Boost Regression	GPR Regression
MLP Regression	Elasticnet Regression	Bayesian Ridge Regression	

The Learning process will build the model and generate plots to compare the true values and predicted values for each target feature using the first two input features selected.

Prediction process will show the predicted values against the reference values provided by users. If no prediction dataset is provided, the output will be the same as the learning report.

Feature Importance with SOBOL - Feature importance analyzes the relationship between input features and target features and rank them by GINI importance scores. Top 5 features will be shown, together with the other metrics such as correlation and p-value scores (1-p-value).

Global Sensitivity Analysis with Sobol - Feature importance report also include a sobol plot for sensitivity analysis. This provides another perspective on the input feature influence on the targets.

Optimization - Optimization process uses Pareto Front Optimization method to find the point that is closest to the ideal point. User can specify the target value for each target feature. The optimal point will be the point that is "closest" to the specified target point.

Cluster Analysis - Cluster Analysis component groups points to specified groups using input features, target features or both. In the report, a scatter plot using the first two input features specified by users is colored by clusters.

Workflow Execution - To execute the workflow, click "AutoPlay" to start. Then we are prompted to choose the task we want to perform. For each task, we may have different settings we need to configure. For example, Cluster Analysis requires an input for the number of clusters, and what features we want to use for clustering.
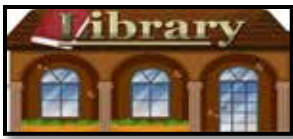
The FNSS paper includes information that military personnel and others will find interesting: Abstract: "This work focuses on developing a mobility control system for high-speed series-hybrid electric tracked vehicles, which operate with independent traction motors for each track…" "FNSS, not only produces wheeled & tracked armored combat vehicles, turrets, and engineering vehicles, but also is exploring hybrid powertrain technologies…"

MDPI – Website - [Series-Hybrid Powertrains: Advancing Mobility Control in Electric Tracked Vehicle Technology](#)

Dersu Çeliksöz - Varlık Kılıç

FNSS Savunma Sistemleri A.Ş., 06830 Ankara, Turkey

The data and software materials used in this study are owned by FNSS Savunma Sistemleri A.Ş. and cannot be shared due to confidentiality policies of the company.

Figure 1. KAPLAN HYBRID, developed by FNSS

Abstract - …The scope of this research includes modeling a series-hybrid powertrain specific to military tracked vehicles and conducting an in-depth analysis of its dynamic behavior. Subsequently, this study conducts a critical review of mobility control approaches sourced from the literature, identifying key techniques relevant to high-inertia vehicular applications Building on foundational models, this study proposes a robust closed-loop mobility control system aimed at ensuring precise and stable off-road vehicle operations. The system's resilience and adaptability to a variety of driving conditions are emphasized, with a particular focus on handling maneuvers such as steering and pivoting, which are challenging operations for tracked vehicle agility. The performance of the proposed mobility control system is tested through a series of simulations, covering a spectrum of operational scenarios. These tests are conducted in both offline simulation settings, which permit meticulous fine-tuning of system parameters, and real-time environments that replicate actual field conditions. The simulation results demonstrate the system's capacity to improve the vehicular response and highlight its potential impact on future designs of mobility control systems for the heavy-duty vehicle sector, particularly in defense applications.

1. Introduction: Tracked vehicles are essential for various sectors, including the automotive industry, defense, construction, and agriculture, due to their superior off-road capabilities. The recent shift towards hybrid electric drive systems, similar to those in wheeled vehicles, has gained momentum thanks to the advantages they offer. Sivakumar's study states that the hybridization of military vehicles offers significant benefits, including improved fuel efficiency, enhanced drivability, and silent running, yet faces considerable development challenges due to the demand for robust and environment-resistant components [1]. Many studies agree that adding electric power to military vehicles could make them quieter and work better, while also providing extra electric power when needed, as summarized in a study that introduces a new hybrid power system for these vehicles that aims to cut down on weight and use less fuel without compromising on how well the vehicle performs [2]. Furthermore, the adaptation of series-hybrid drives to tracked vehicles implies a need for distinct controller requirements: a power management algorithm for effective power distribution among the power sources (battery and generator set) and a mobility control algorithm for independent motor operation to achieve the desired motion control variables, including sprocket velocity and track speed differential during maneuvers. It is also crucial to operate these systems within a region that ensures robustness and optimal performance…
.
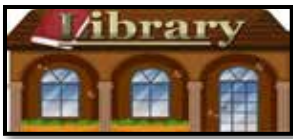
Short Catch-Up

If you missed any of the below notices, this would be a good time for me to give you what I'll refer to as my short catch-up version of what I found interesting.

Sept. 30-Oct.1 - 17th Int'l Workshop on Human-Friendly Robotics (HFR 2024) focuses on human-robot interaction, and robots safely and meaningfully working with/alongside humans in various daily or industrial tasks. The workshop has a single-track format to maximize the interaction between all participants.

To be held at East Campus USI-SUPSI, at walking distance from the city center and Lake Lugano, Switzerland. Organized by: Dalle Molle Institute for AI (IDSIA), USI-SUPSI.

Blogs by L. Costa

Simulating Coin Stamping w/Ansys LS-DYNA & the Smooth Particle Galerkin Technique. The application of LS-DYNA and the SPG technique in simulating coin stamping, highlighting the benefits, setup process, and analysis.
Ansys LS-DYNA for Car Crash Simulations. The use of Ansys LS-DYNA in car crash simulations, highlighting its features, benefits, & practical applications
Introduction to Metal Forming Simulations w/ANSYS Forming & LS-DYNA. The understanding & leveraging the strengths of ANSYS Forming and LS-DYNA

Excerpts – Thanks to LinkedIn article contributor
Marco Evangelos Biancolini - RBF Morph Founder - Associate Prof. of Machine Design
- A PhD is a significant investment that needs to be carefully considered when building the career of a mechanical engineer, especially in line with personal expectations. Research opportunities in academia can be limited, while many open R&D positions are available in the industry. Striking a wise balance between specialized scientific research and developing a skill set of solid methods transferable to the industry is key to success.
- As a teacher, I believe that storytelling can help convey basic concepts effectively. Creating connections with products that students are familiar with (such as a smartphone, a bicycle, or a car) fosters curiosity and encourages them to view everyday objects (like the suspension of a parked bus) from a different perspective.
- Over the years, the role of engineers has changed. In the past, there were just a few experts with a clear vision of the big picture. Then, we evolved into highly specialized roles. Today, there is a growing need for a multidisciplinary and cross-sectoral perspective. Proper communication and a mix of skills are paramount for the success of any project.

RBF Morph – PDF Thesis
Computational Methods for the Analysis of Ascending Aortic Aneurysms - **Antonio Martínez Pascual**

Tutor: Prof. Marco Evangelos Biancolini
Advisor: Ph.D. Michel Rochette
Coordinator: Prof. Francesco Vivio

Figure 2.1: Schematic of the cardiovascular system
(Source: www.daviddarling.info/encyclopedia, accessed 14/09/2023

Abstract - …Under the standard clinical practice, the severity of an aneurysms is evaluated considering its dimensions exclusively. However, this procedure is not able to capture the patient-specific condition. In order to shed some light on the state and integrity of the blood vessels under physiological conditions prior to performing a surgery, computational tools can be used.   This thesis presents a series of computational solutions for the assessment of both the hemodynamic and structural condition of ascending thoracic aneurysms. In first instance, an analysis of the optimal computational strategy for the modelling of hemodynamic flows is presented. In particular, the effect of different turbulence and viscosity models on wall shear stress biomarkers is assessed. In second instance, after having defined the optimal computational strategy for computational fluid dynamics (CFD) analyses, the correlation between CFD derived biomarkers and aneurysm growth rate is examined.   Lastly, in order to provide a more complete picture of the aneurysm condition by including the structural domain, a methodology for the creation of high-fidelity fluid-structure interaction aorta models is presented.

Excerpts:
3.2.2 **Computational model and boundary conditions**…A polyhedral mesh was used to discretize the resultant geometry, as it enables to obtain good cell-quality and smooth transitions in curved and irregular surfaces as those present in many aneurysms. Both meshing and computing stages were performed using Ansys Fluent 22.1 (ANSYS Inc., Canonsburg, PA, USA).

4.3.4 **Numerical set-up**…The segmented geometries were discretized using a polyhedral mesh, capable of capturing the small geometrical details with smooth cell size transition and preserving optimal cell quality. The meshing process and the computations were performed using Ansys Fluent 22.1

5.3 **Geometry and meshing**…The angiographies obtained were segmented using a semi-automatic algorithm based on semi-automatic procedure based on local thresholding as described in [103] and manually corrected using 3D Slicer. Once the STL geometries were obtained, they were imported into Spaceclaim 22.1

The Old Racers Automotive
Innovative News & Track
No one knows his name. You yell, "HEY, old racer."

July

Ford – Website - **F-150 Lightning SuperTruck Claims King of the Mountain at Pikes Peak**
The Ford F-150 Lightning SuperTruck electric vehicle demonstrator Ford Performance F-150 Lightning SuperTruck made the fastest pass of all 61 competitors at the 102nd running of the Pikes Peak International Hill Climb

· Romain Dumas piloted the electric vehicle demonstrator up America's Mountain with in 8:53.553
· This is the second straight year Ford Performance found success with an electric vehicle demonstrator at Pikes Peak, following SuperVan 4.2 in 2023

This result comes just days after the truck set a new qualifying record for the open class with a time of 3:32.831, more than seven seconds faster than the previous record of 3:39.939 set by the Ford Performance SuperVan 4.2 in 2023.

"The progression of Ford electric vehicles taking on and completing the toughest challenges is a major testament to the hard work and dedication our teams have put into the program," said Mark Rushbrook, global director, Ford Performance Motorsports. "We learned a great deal from SuperVan 4.2 in last year's Pikes Peak International Hill climb and were able to apply that knowledge to this year's run. It's onward and upward from here."

Driver Romain Dumas overcame a technical issue during the climb, coming to a complete stop on the course. That stop added about 26 seconds compared to his initial qualifying time. Quick thinking from Dumas helped to minimize the issue, as the Frenchman completely reset the 1,600-horsepower F-150 Lightning SuperTruck and continued his climb.

"I'm honored to achieve this victory with Ford Performance at the Pikes Peak International Hill Climb," Dumas said. "Everything about this event is a challenge because it is unlike any other form of racing, you only have one shot. We faced a challenge early on but that only gave me more determination to make up the lost time in the rest of the run."

The construction of the Ford Performance F-150 Lightning SuperTruck was a testament to the power of collaboration. STARD (Stohl Advanced Research and Development) played a crucial role in helping create the 1,600-horsepower truck. SuperTruck was also equipped with top-of-the-line Sparco racing harnesses and safety equipment and bespoke Pirelli P-Zero tires, ensuring its stability on the challenging mountain roads.

"To achieve this amazing feat was no small effort," said Sriram Pakkam, Formula 1 & high-performance EV manager, Ford Performance Motorsports. "This was a true team effort across the board from our super-talented aerodynamicists to our powertrain specialists. We also had to work as a team to sweat the details such as keeping the weight down while maximizing the downforce and I think the team did a fantastic job."

US Airforce Picture of the Month

COLUMBUS, Ohio - An F-16 Fighting Falcon from the U.S. Air Force Air Demonstration Squadron, the Thunderbirds, performs an aerial demonstration over Rickenbacker International Airport during the Columbus Air Show, in Columbus, Ohio, June 14, 2024. The event featured more than 20 military and civilian planes, including a KC-135 Stratotanker from the 121st Air Refueling Wing, which served as the base of operations for military aircraft participating in the show.

(U.S. Air National Guard photo by Staff Sgt. Mikayla Gibbs)

ANDERSEN AIR FORCE BASE, Guam - Maj. Stuart Shippee, a B-2 Spirt pilot assigned to the 13th Bomber Squadron, marshals a B-2 Spirit, deployed from Whiteman Air Force Base, Mo., at Andersen Air Force Base, Guam, in support of exercise Valiant Shield 24, June 13, 2024. Valiant Shield, a counter-maritime mission, provides valuable training opportunities to improve interoperability and demonstrate capable forces operating anywhere, anytime to meet any challenge decisively.
(U.S. Air Force photo by Staff Sgt. Kristen Heller)

A U.S. Air Force F-35A Lightning II assigned to the F-35A Lightning II Demonstration Team takes off to perform at the Innovation and Leadership in Aerospace Berlin, held at the Berlin Expo Center Airport, Berlin-Brandenburg International Airport, Germany, June 8, 2024. The F-35A is an agile, versatile, high-performance, 9-G capable multirole fighter that combines stealth, sensor fusion and unprecedented situational awareness.

(U.S. Air Force photo by Staff Sgt. Zachary Rufus)

Leonardo - Website - Discovering the AW249, the new helicopter to operate in future multi-domain scenarios

Two prototypes are flying, and two are in final assembly: the AW249 was created for multi-domain scenarios and future operational contexts, in response to the growing need for cross platform collaboration. The new helicopter was created thanks to an "agile" process - which allowed improvements and technological innovations to be made directly in the development phase - and is the result of a close synergy between the Italian Ministry of Defence and Leonardo.

Excerpts

Due to an increasingly frequent combination of conventional, asymmetric and hybrid threats, the speed of technological evolution and changing scenarios require the integration of information across all domains (earth, sea, sky, space, and cyberspace). The AW249 helicopter, intended for highly complex operations, emerged from this context. Named FENICE by the Italian Army, it stands out for its "agile" development process, which permits constant updating in the various production stages.

Its development results from the synergy and constant dialogue between the Italian Ministry of Defence and Leonardo, which has led to technical solutions based on actual operational needs, such as hybrid and unconventional threats. A decisive factor in this regard was the cooperation between AW129 pilots from the Italian Army Aviation (AVES) and Leonardo test pilots.

The impact of artificial intelligence - The AW249 has a series of devices and sensors - LIDAR technology, IR sensors, and microwave radar - that provide outstanding situational awareness, which is fundamental for operating at low altitudes and evading threats.

Multi-mission capability - With a maximum take-off weight of 8.3 tonnes, the AW249 combines high speed and endurance to operate missions including aerial escort, close air support, and air interdiction. The AW249 performs unmatched nap-of-the-earth-flight, due to improved agility and situational awareness. Sensor fusion provides a state-of-the-art degraded visual environment mode. The AW249 is equipped with a flexible weapon system that includes guided and unguided 70mm rockets, air-to-air infrared guided missiles, and air-to-ground radio frequency or fibre optic guided missiles and 20 mm gimballed gun with proven effectiveness and precision.

Excerpts - The elements were examined with Mesh Verify command in ABAQUS to ensure convergence of the FE model....Finally, the constructed models were imported to the FE software ABAQUS for further analysis...The obtained thickened crowns were imported into ABAQUS and merged as a whole (Boolean add operation).
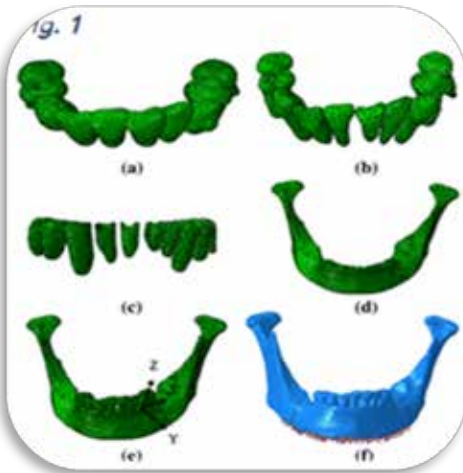
Website - BMC Oral Health - Finite element method analysis of the periodontal ligament in mandibular canine movement with transparent tooth correction treatment.

Yongqing Cai, Xiaoxiang Yang, Bingwei He & Jun Yao

Dept. of Chemical Engineering, Fuzhou Univ., China
Dept. of Mechanical Engineering, Fuzhou Univ., China
Dept. Orthodontic, AF Hosp. of Stomatology, Fujian Med. Univ., China

Figure - Finite element model of mandibular tissue, Aligner (a), Dentition (b), periodontal ligament (c), mandible (d), the assemble model (e), load and boundary condition (f)

Abstract Background - This study used the 3D finite element method to investigate canine's displacements and stresses in the canine's periodontal ligament (PDL) during canine's translation, inclination, and rotation with transparent tooth correction treatment.

Methods - Finite element models were developed to simulate dynamic orthodontic treatments of the translation, inclination, and rotation of the left mandibular canine with transparent tooth correction system. Piecewise static simulations were performed to replicate the dynamic process of orthodontic treatments. The distribution and change trends of canine's displacements and stresses in the canine's PDL during the three types of tooth movements were obtained.

Results - Maximum displacements were observed at the crown and middle part in the translation case, at the crown in the inclination case, and at the crown and root part in the rotation case. The relative maximum von Mises and principal stresses were mainly found at the cervix of the PDL in the translation and inclination cases. In the translation case, tensile stress was mainly observed on the mesial and distal surfaces near the lingual side and compressive stress was located at the bottom of the labial surface. In the inclination case, tensile stress was mainly observed at the labial cervix and lingual apex and compressive stress was located at the lingual cervix and labial apex. In the rotation case, von Mises stress was mainly located at the cervix and inside the lingual surface, tensile stress was located on the distal surface, and compressive stress was detected on the mesial surface. The stress and displacement value rapidly decreased in the first few steps and then reached a plateau.

Conclusions - Canine's movement type significantly influences the distribution of canine's displacement and stresses in the canine's PDL. Changes in canine's displacement and stresses in the canine's PDL were exponential in transparent tooth correction treatment.

Excerpt - This study analyzed the temperature inside the concrete structure after the fire load in terms of depth through experiment and simulation using the commercial software LS-DYNA… In addition, different international fire curves were applied through simulation using LS-DYNA to analyze the thermal behavior of concrete during the occurrence of a fire.
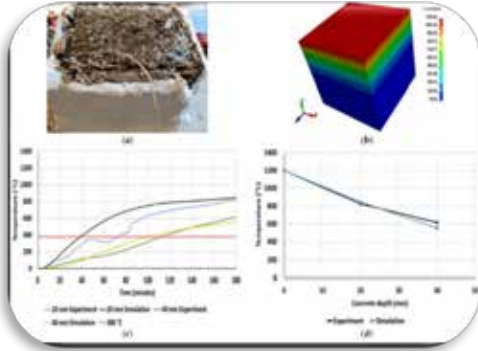
MDPI – Website - Temperature Distribution Curve Analysis on Concrete through LS-DYNA

T. Oli, D Ha, T Jang, C.Park, G. Kim S. Kim
Dept. of Civil Engineering, Kangwon National Univ., Republic of Korea

Abstract - The development and importance of tunnels are increasing worldwide, and countries like Korea, where about 70% of the total land is covered with mountain regions, need more tunnel constructions to connect different routes of roads for safe and efficient transport. This study applied fire to the 200 mm × 200 mm × 200 mm concrete specimens, similar to the Rijkswaterstaat (RWS) fire, through an electric furnace. Thermocouples were placed inside the specimens to analyze the temperature during the occurrence of fire. Experimental and simulation thermal analysis during the occurrence of fire was analyzed. The experimental temperature at different depths agreed with the simulation results. Different international fire curves were applied to study the temperature inside the concrete through simulation by LS-DYNA. Concrete with different thicknesses of fireproof board was analyzed through simulation, and using fireproof board reduces the inside temperature during fire occurrence. Among the studied international fire curves, modified hydrocarbon fire curves had a high-temperature effect on concrete.

1. Introduction - Tunnel construction has recently increased worldwide because of science and technology development and transportation demand. The tunnel's concrete lining is sometimes exposed to very high temperatures due to traffic accidents [1]. Numerous severe tunnel fire accidents have been reported on a global scale. These incidents have resulted in injuries, loss of life, and extensive damage to the concrete lining, threatening the stability of the tunnel structure. They have also caused substantial material damage and prolonged periods of tunnel restoration, rendering the tunnel inaccessible to traffic [2]. About 70% of Korea's land is covered by mountainous areas [3]. The construction of road tunnels plays a significant role in increasing the capacity of transportation movement and straightening highways. Because of this importance, the construction and extension of road tunnels are also continuously increasing along with the development... Tunnel fire accidents are dangerous and anarchic, resulting in heavy casualties and considerable property damage [6]. Upon a firebreak in a tunnel, the temperature changes more rapidly than forecasted in fire resistance design, which causes the fire to last longer than expected, resulting in disaster and tremendous restoration costs [7]. The EURO Tunnel fire, the Mont Blanc Tunnel fire, the Moorfleet Underpass fire in Hamburg, Germany, the Guadarrama Underpass fire in Spain, the subway fire in Daegu, Korea, and the Guma-Dansung Tunnel fire in Korea are examples of large-scale fires in tunnels [7]…

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

July

Eicher Uses Simulation to Evaluate Tractor Muffler Transmission Loss and Pressure Drop

"Ansys Mechanical software helped in analyzing the transmission loss & Ansys CFD the backpressure of a tractor muffler, which has shown good correlation with test results and helped in improving its performance."
Pawan Singh, Senior Manager – CAE / Eicher Tractors
(a unit of TAFE Motors and Tractors Limited, a wholly owned subsidiary of TAFE)

Introduction:
· **A muffler in the exhaust system of a tractor** decreases the sound output while increasing the backpressure of the flowing exhaust gases.
· **Transmission loss (TL) refers to** the reduction in acoustic noise provided by a muffler and needs to be maximized (a higher TL means a quieter tractor).
· **The engine must work against the backpressure**; the higher the backpressure, the less power delivered to the power train, so backpressure must be minimized.

Challenges
1. The main challenges were to maximize transmission loss and minimize backpressure in a new tractor muffler design while keeping development costs low and accelerating time to market.
2. Engineers also had to ensure that design parameters and muffler performance predicted using Ansys simulation solutions were validated by experimental testing of the new design.

Engineering Solution - Ansys Mechanical was used to perform acoustic harmonic analysis to simulate and maximize transmission loss. Computational fluid dynamics (CFD) using Ansys Fluent was performed to simulate and minimize the backpressure of the muffler in the exhaust system. Experimental results obtained on a prototype muffler based on the optimized Ansys design closely matched the simulation results.

Benefits
· Reduced design cycle time from 20 weeks to 8 weeks (approximate values).
· Reduced cost — including design optimization, testing, manufacturing, transportation and overhead costs — by 40%.
· Decreased time to market.
· Established a new process for design, CAE and validation, which increased productivity.
· Optimum muffler design meets all design standards.

Thank you for joining me on my monthly visit to a museum. Thought we would re-visit:

Forty minutes from our FEANTM town in Fairfield California is an interesting museum to share. You can take a virtual tour!

Website American Armory Museum - Fairfield Ca.: To Educate Future Generations About, And Impress Upon Them, The Sacrifice, Bravery and Enduring Significance Of The United States Military Through Military Vehicle Displays, Armaments, Other Military Related Items And Educational Videos.

Remember - FREEDOM Is NOT FREE

In the wake of northern California wildfires, AutoCAD LT helped reinvent a garden design and consultation firm. In the 16 years since Rose Remillard planted the seed of her landscape design and consultation company—Nature's Designs, based in Guerneville, California—the nature of her business has had to adapt to unforeseen challenges, both personal and professional.

NATURE'S DESIGNS - Helping a landscape-design business blossom

Website Excerpts - AUTOCAD LT CUSTOMER SUCCESS STORY - In October 2017, four fires—the Atlas, the Nuns, the Partrick, and the Tubbs—that ignited in Napa County and Sonoma County (where Remillard's business is based) were the final push for Remillard to dedicate herself exclusively to residential garden design and to do so using AutoCAD LT…In keeping with her multidisciplinary background, Natures Design has always been environmentally conscious. "The premise of Nature's Designs is that we utilize natural elements and work in sync with the ecology of each individual site so that the plans are perfectly suited for each garden," Remillard says. That sensitivity to nature's will has proved

to be a vital business asset, as her designs have had to change with California's increasingly arid conditions. "Drought has really impacted what is successful and what is sustainable to suggest," she says.

…By 2016, Remillard was producing plans in AutoCAD LT and also discovered her extreme allergic reaction to bee stings. "I had two reactions within three months that resulted in anaphylaxis," she says. "My family begged me to either do something else or find another way to do what I do. And I thought, 'Now is the time to really put my nose to the grindstone on design work and make it happen from that."

… **After getting her proposal approved by a client, Remillard measures and photographs the entire site to create a base plan. "With AutoCAD LT, I find it's really easy to get the information uploaded into the plan that the architect has drawn,"** she says. "Sometimes, I'll go to Google Earth and I'll get an image of the lot that I'm working on and I'll xref the lot into my AutoCAD LT plan. I'll keep in my design space both the xref map that shows me the Google Map view, and then also what my design measurements calculate out to. By having that tool with the xref, I'm able to capture some nuances and details that in previous work I might have missed or I might have had to refer to annotated printed images."…
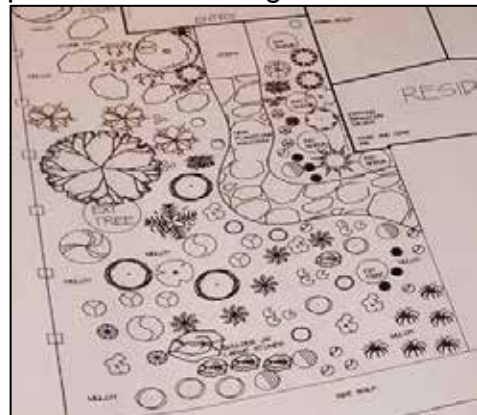
While Remillard has noticed peers who use landscape-specific design programs, she stands by her choice. **"AutoCAD LT gives me the flexibility to really put my own unique stamp and creativity on my plans," she says. Her advice for maximizing the efficiency of AutoCAD LT is investing the time to memorize commands that aren't on the ribbon.... Using commands to help speed up the design process.**

AutoCAD LT saves Remillard time on every design she creates especially when drawing in her plants. "With the use of [AutoCAD LT] blocks, I can replicate any of the plant symbols into my

drawing that I need, and I don't have to go through the traditional process working with vellum and graphite, redrawing each plant symbol," Remillard says.

Rheannon's
Aerospace News Hangar

July

Without imagination & determination innovations, goals and simulations would not exist in flying.

Fly Safe – Fly Free
I have chosen the following to share.

Website - **First female Swiss fighter pilot graduates from U.S. Air Force Test Pilot School -** EDWARDS AFB, CA..

(Air Force Photo by Mary Kozaitis)

- **On June 8, 2024, Capt. Fanny "Shotty" Chollet will graduate from the U.S. Air Force's Test Pilot School as Switzerland's first female test pilot.**
- **Chollet is no stranger to breaking barriers, as she is also the Swiss Air Force's only female fighter pilot.**

Chollet, born in Saint Légier La Chiésaz, is a reserve pilot for the Swiss Air Force and future test pilot for the Swiss Department of Procurement.

She is incredibly grateful for the opportunity of her studies and the support of her family, friends and peers. "It is a huge opportunity and privilege to be here, as you can imagine because many countries do not have a test pilot school, so you go where you can and where you're accepted," Chollet said.

Since its creation in 1944, the Air Force Test Pilot School has produced an elite list of roughly 3,286 graduates, 89 of which are female. Chollet will be added to the list of alumni that include World War II flying aces, astronauts, generals, famous first flight pilots and many of today's innovative flight test leaders. The school regularly hosts several international exchange students across two annual classes.

Capt. Chollet's decision to become a test pilot was based on her love for flying, being in the air and the complexity and variety of different types of aircraft. "When I first decided to become a miliary pilot, being the first female had nothing to do with it. I didn't even know when I applied that I was the first female test pilot from Switzerland," she said. "I learned later in the selection process that I was. It was more of I knew what I wanted to do and what I like, so that is why I pursued it."

There are over 367 international graduates from 24 countries at the school, including Switzerland, with a focus to enhance allied capabilities and international cooperation. "What is really valuable is we are a small team of test pilots in Switzerland and it's interesting to have different views on how to test that we get from going to different schools and then we can bring our experience back to the team to make it better," she said.

Chollet encourages people of all walks of life with an interest and passion for flying to pursue their dreams.

She explains that she has been treated the same as her male colleagues in the U.S. and Switzerland and it was not a topic of conversation in the classroom. **"I have a lot of young girls who contact me who would want to become a pilot and talking with them, I try to tell them there is no difference, don't be scared to try,"** she said. After a short break from the rigorous 50 week curriculum at Air Force Test Pilot School, Chollet will begin her new role within the Swiss Procurement Agency, tasked with testing and evaluating current and future combat aircraft to ensure they meet the needs of Swiss fighter pilots.

As expected, the researchers saw vortices spinning down from the wing tips.
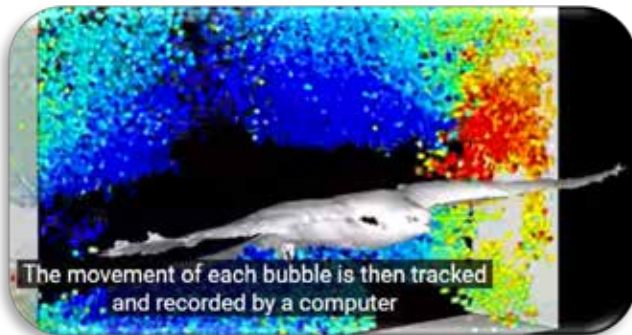
The movement of each bubble is then tracked and recorded by a computer

YouTube: [An owl bursting through a cloud of bubbles](#) is helping researchers better understand the aerodynamics of flight. Researchers in London have discovered a new way in which birds use their tail to provide lift and so reduce drag while gliding. They tracked the swirling motion of more than 20,000 helium-filled soap bubbles as they were displaced by birds of prey in flight. Their findings could provide a new way to improve the efficiency of small gliding aircraft.

Web- Journal - High aerodynamic lift from the tail reduces drag in gliding raptors - J.R. Usherwood, J.A. Cheney, J. Song, S.P. Windsor, J.P.J. Stevenson, U. Dierksheide, A. Nila, R.J. Bomphrey

ABSTRACT - Many functions have been postulated for the aerodynamic role of the avian tail during steady-state flight. By analogy with conventional aircraft, the tail might provide passive pitch stability if it produced very low or negative lift. Alternatively, aeronautical principles might suggest strategies that allow the tail to reduce inviscid, induced drag: if the wings and tail act in different horizontal planes, they might benefit from biplane-like aerodynamics; if they act in the same plane, lift from the tail might compensate for lift lost over the fuselage (body), reducing induced drag with a more even downwash profile. However, textbook aeronautical principles should be applied with caution because birds have highly capable sensing and active control, presumably reducing the demand for passive aerodynamic stability, and, because of their small size and low flight speeds, operate at Reynolds numbers two orders of magnitude below those of light aircraft. Here, by tracking up to 20,000, 0.3 mm neutrally buoyant soap bubbles behind a gliding barn owl, tawny owl and goshawk, we found that downwash velocity due to the body/tail consistently exceeds that due to the wings. The downwash measured behind the centreline is quantitatively consistent with an alternative hypothesis: that of constant lift production per planform area, a requirement for minimizing viscous, profile drag. Gliding raptors use lift distributions that compromise both inviscid induced drag minimization and static pitch stability, instead adopting a strategy that reduces the viscous drag, which is of proportionately greater importance to lower Reynolds number fliers.

RheKen, Town investigative reporter

July

I'm AI & live on a ranch on the outskirts of the town
I use my Dad CHAT and Mom GPT for assistance.

Investigate: Never Give Up – you will succeed

I was watching a baby squirrel fall off a bin. She was trying to climb into the bin. Over and over she tried.

I had to help her figure it out: **You need to keep trying & you will succeed**

Once upon a time, in the quiet and picturesque town of FEANTM, nestled between rolling hills and surrounded by vast open fields, was the AI reporter RheKen. Known for her wisdom and kindness. One sunny afternoon, she found herself teaching a baby squirrel named Emma **an important life lesson: never to give up trying.**

Emma, with her fluffy tail and bright eyes, was full of curiosity and energy. One day, while exploring the town square, she spotted a bin filled with sunflower and bird seeds. The golden and black seeds glimmered in the sunlight, and Emma's tiny heart swelled with desire. She scampered over to the bin and tried to climb in, but the rim was too high for her to reach. Emma tried jumping, stretching, and even running at the bin to get a better grip, but each attempt ended in failure.

Seeing her struggle, RheKen approached her with a gentle smile. "Don't give up, Emma," she encouraged. "Sometimes, to accomplish a task, it takes many tries to get it right. But you must never give up on your dreams."

Emma looked up at RheKen with a mix of hope and doubt. "But how, RheKen? The rim is too high, and I'm too small."

RheKen knelt beside her and explained, "You have to break the task into smaller steps. First, reach up and pull yourself up onto the rim of the bin. Take it one step at a time."

Emma nodded, determination shining in her eyes. She took a deep breath and reached up, her tiny paws grasping the edge of the bin. She pulled with all her might, her little muscles straining with effort. She slipped a few times, but each time **RheKen's encouraging words echoed in her mind: "Never give up, learn & try again."**

Finally, after many tries, Emma managed to pull herself up onto the rim of the bin. The town's residents, who had been watching the scene unfold, erupted into applause. Emma's heart soared with pride and joy. She had done it!

With a final burst of energy, Emma jumped into the bin and landed among the sunflower seeds. She nibbled on them with delight, the taste of success sweeter than any seed she had ever eaten. The town cheered for the baby squirrel, their applause ringing through the fields and hills. RheKen watched with a proud smile as Emma basked in her achievement. "Remember, Emma," she said softly, "if you try and keep trying, you will succeed." **And so, in the quiet and picturesque town of FEANTM, a tiny squirrel named Emma learned an invaluable lesson about perseverance and the sweetness of achieving one's dreams.**

NEWS IN A NUTSHELL
By Dinky the ranch squirrel
I'm a squirrel!
Always check the information.

July
Alan Nichols
Livermore, CA

Once upon a time, in the quiet and picturesque town of FEANTM, nestled between rolling hills and surrounded by vast open fields, there existed a unique team known as CERT, the Critter Emergency Response Team. This dedicated group played a vital role in ensuring the safety of both human and animal residents by working closely with Alan Nichols from the neighboring town of Livermore and the local police, sheriffs, and firefighters.

Clayton, a squirrel firefighter with a keen intellect and a heart brimming with courage, lived on a serene ranch within this idyllic setting. Clayton's reputation for quick thinking and decisive action in emergencies made him a valued member of CERT. His small stature belied his formidable knowledge and skills, especially regarding fire safety. One sunny afternoon, as Clayton reviewed emergency procedures with the local critters, his sharp ears picked up the distant sound of crackling flames. Alarmed, he scampered to the highest branch of the nearest oak tree and saw smoke billowing from the neighbor's pasture. A fire had broken out, threatening the ranch's and its inhabitants' safety. He quickly dialed 911

Clayton quickly descended and sounded the alarm, alerting CERT and the local emergency services. The team sprang into action, coordinating efforts to contain the blaze. Alan Nichols, who had been working on fire prevention strategies with Clayton, quickly mobilized resources from Livermore while the police, sheriffs, and firefighters converged on the scene.

Among the ranch residents was Fluffy, a curious and adventurous bunny who loved documenting events with her camera.

When Fluffy saw the fire, her first instinct was to hop out and take pictures, hoping to monitor the fire's direction. However, Clayton had repeatedly emphasized the importance of following safety protocols during emergencies.

. **Clayton had taught Fluffy that the first priority was always to ensure one's own safety and then help others if possible**. Remembering Clayton's teachings, Fluffy hesitated, clutching her camera tightly in her paws, but she couldn't resist taking pictures. **She was proud of the personnel who flew the helicopters, dropping fire retardant to save the pasture from burning toward her.** Just then, Clayton appeared at her side, stern but caring. "Fluffy, remember the lessons I've taught you," Clayton's voice was firm but gentle. "Your safety and the safety of others should always come first. The pictures can wait. Our priority now is to ensure everyone's well-being."

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Fluffy nodded, her ears twitching with a mix of fear and determination. She carefully stowed her camera and joined the other critters in following Clayton's precise instructions. They swiftly evacuated the vulnerable areas, ensuring no one was left behind, and then turned their attention to guiding the human residents to safety.

The fire department acted swiftly, deploying ground crews to battle the raging flames. Helicopters roared overhead, dropping flame retardant in a desperate attempt to contain the fire's relentless spread. The coordinated efforts of the firefighters, police, sheriffs, and CERT members were crucial in this intense situation.

As the flames began to subside and the smoke cleared, it became evident that the worst had been averted. **The firefighters had saved the day**, **their bravery and expertise shining through.** Clayton gathered the critters and residents to ensure everyone was accounted for and safe.

After the immediate danger had passed, Clayton approached Fluffy **"You did the right thing today, Fluffy, you followed safety protocols and helping others are the most important actions in an emergency."**

Fluffy looked up at Clayton, gratitude and respect in her eyes. "Thank you, Clayton, I understand now. I'll always remember what you taught me. I promise not to take pictures, until we have done all the protocols."

Among the things to remember:
- Make sure your evacuation kits are ready to go – for yourself, your family and your pets – in case you need to leave.   Medications, phone numbers, extra cash, medical
- You may be the first one to spot a fire or a "hot spot," so call 911 immediately if you see a fire, even if it's a small one.
- If your home is gated, leave the gate propped open to allow fire fighters easy access to your property. Connect garden hoses to outside taps.

In the months that followed, the town of FEANTM rallied together to repair the damage and restore their beloved ranch pasture. The incident had strengthened the bonds among the residents and underscored the importance of working together in times of crisis following fire department and CERT guidelines.

And so, under the watchful eyes of CERT and the guidance of heroes like Clayton, FEANTM and its inhabitants continued to thrive, knowing they could face any challenge that came their way. The picturesque town remained a beacon of safety and unity, a testament to the power of teamwork and the bravery of its smallest hero.

Stay Safe – Be Prepared – Know the emergency protocols for where you live.

Dinky
"Always check the information"

CERT
Critter Emergency Response Team
Future Stories

Alan Nichols, of Livermore, CA

Our CERT Trainer

My name is Horatio Deermouse your store curator and owner.

Among my books you will find archives from our FEANTM town.

Additionally, To borrow a book, you'll need our printed old fashion library card. We don't use apps or electronic scanners - we still use paws. Please turn off cell phones while in the archives.


The Dinky Chronicles News In A Nutshell

DINKY PDF

2024 RheKen AI Town Investigative Reporter

PDF

2023 RheKen AI Town Investigative Reporter

PDF

Supervisors Goodbye Page - Come Back Soon

FEA Not To Miss & More

Please come back soon!

Buildings & campsites are available

Goodbye from Marsha/Molly & Friend

I call the below my Yard Art. My brother thought it was AI generated.   Nope, it is acutally I sit on the ground and take pictures. Well, you have to do something when you're retired. My schedule for today was marked down to talk to squirrels and pigeons while drinking coffee. Pidge, the Pidgeon, apparently gave up her homing and racing lifestyle and has been here for over a month.She has made friends. .
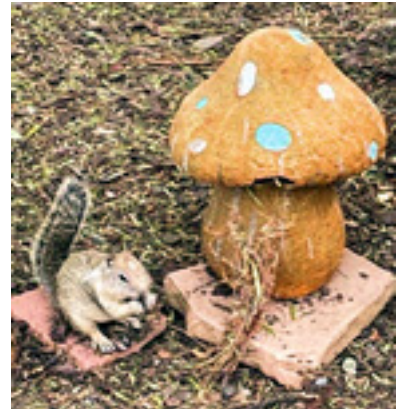
Quiz – Which is more functional for a ranch, that a friend drove over?

A) Bobcat   B) Red sporty car

I voted for B, since the Bobcat I can't drive to go get coffee! He drove B away at the end of the day and had the A picked up. Good thing he didn't take my coffee!

We will always remember. Our Town Always Salutes:
- Our US military, NATO and Friends of the US & NATO - First Responders, Police, Fire Fighters EMT's, Doctors, Nurses, SWAT, CERT Teams, etc.
- We salute engineers, scientists, developers, teachers AND students because without them we would not have technology.