



FEA - CAE Not to Miss & More -
August **ISSN 2694-4707**
Monthly Town Hall Meeting
Engineering, Research, Interests
www.feantm.com

Airport



Automotive



Automotive



Secretary – Tata



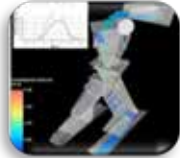
Marco - RBF/Univ.TorVergata



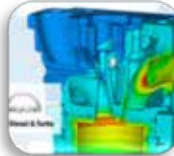
Curt - Autodesk



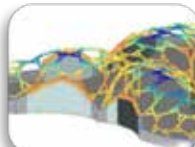
Metin - OZEN Engineering



Madhukar - CADCAM



Marta - OASYS



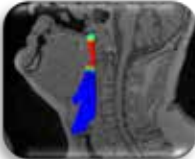
Archives – Kevlar Inventor



Margaret - CADCAM



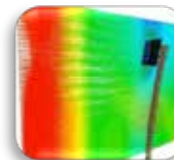
Adam - Simq



Brianna - LLNL



Bart - LS-DYNA Multiphysics



Bailey - Dr. M. Andalibi



Marjorie - LTTS



Kensi's Garden



Rhea's Hangar



Quinn's Movie



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

FEA not to miss a/k/a (FEANTM) **Blog is a collective of individuals who exchange information**
Welcome to reading information that we find interesting. This is a hobby, no compensation.

Legal - the shortened version (town attorney will be upset BUT it was too long to read)

Town: We believe in our effort to advance knowledge and to share information.
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...from that point onward, you are removed - yes you can always come back.

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 and AI editors are the products of imagination.
Any resemblance to actual persons, living or dead, or actual events is purely coincidental.



We will always remember



Parking & Coffee are free.

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

CADFEM

DFETECH



IOZEN

d3VIEW

Oasys

rescale

ENGINSOFT

Ansys

AUTODESK

Applus
Datapoint Labs

Petting Zoo



Old Rancher



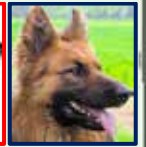
Town Hall



Lawrence Livermore
National Laboratory



Fire & Police Depts.



rbf

MEDITATE

Auto Race track
& Auto Industry



Rheannon's
Aerospace Hangar



Kensington's
Garden



Elect/Water. &
Sewage Treatment
Plant Facilities

- Logos displayed represent companies/academia/research with solutions for today's world.
- If you wish to have yours removed, kindly inform us at feaanswer@aol.com.
- Proceeds from the auction of your building will be allocated to the coffee budget.
- The map is subject to change - building sites will be rotated accordingly.



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- **The individuals mentioned are the persons we wish to thank.**
- **The above doesn't imply that they are the author, with a particular company, or department**

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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 & Ulker Chocolate

The town consists of individuals finding solutions, and caring about animals and children.

Town Gossip is at the local coffee shop.

Pets are welcome. Horses, pet goats stay outside.

Town Motto: Creation is born from trying. If it doesn't work, then you learn & try again. You will succeed. Ideas, simulations, medical cures, & creativity would not come to life without failure and the passion to try again.

Our town meeting has exciting articles this month, including:

**Tortoises (AUTODESK) - bumblebees (Comsol)
squids (ANSYS) - papayas (ANSYS)**

New Section - In the archives we will feature women who have made contributions to the field of science. We will begin the new area with the inventor of Kevlar!

Special thanks to Charlotte and Keith from Wyoming, US for sharing the story of how they saved their squirrel, for fitting it into a Dinky Section story, and allowing us to use it. It's an excellent story. Also, remember that your local community firefighters are there to help with more than just fires. Consider joining your local CERT (Community Emergency Response Team).



The University of Rome Tor Vergata has a new Degree Course in Veterinary Medicine.

Special Notice - About 10% of the 60 million pets in Italy live in Lazio. In addition, this region has many centers of excellence in research including biomedical, pharmaceutical and biotechnological. Veterinary physicians play a crucial role in both medicine and pharmaceutical development. A welcome new degree course!



Article:

Transfer Chute Analysis by G. Ibarra. The Discrete Element Method (DEM). Computational approach to simulate the dynamics of particulate materials.



Article:

CADFEM was commissioned by MAN Diesel SE, with the thermomechanical analysis of a cylinder head for a marine engine using FEM and CFD simulation.



Article:

d3VIEW's new AI agent for your assignments. FORA acts as an experienced colleague. Configure, build, execute workflows, as well as evaluate and optimize designs.



Article:

The pervasive use of engineering simulation during the design phase and for virtual testing, thus eliminating the need for multiple prototypes prior to product launch, is well established today.



ANSYS Learning Hub: This is interesting! The Hub offers two new self-paced learning courses. I'm signing up for both.

In the two courses listed below you will learn: How RBF Morph is integrated with solvers (Fluent, Mechanical) as well as with orchestration tools (Optislang) and Digital Twin generation (Twin Builder).

Website - [Ansys RBF Morph Structures Getting Started \(Self-paced Learning Available\)](#)

Website - [Ansys RBF Morph Fluids Getting Started \(Self-Paced Learning Available\)](#)

Both Courses are organized into 7 lessons: You will be guided step by step in discovering tools and functionalities of the software. Supporting material is provided to clarify and deepen certain key concepts about mesh morphing.

Course Overview

How to install & use Ansys RBF Morph Structures.

Understand what radial basis function (RBF) mesh morphing is and learn

Learning Outcome

Following completion of this course, you will be able to:

- Install & independently use RBF Morph Structures.
- Navigate through the RBF Morph material.
- Understand and use the basic tools of RBF Morph Structures.
- Use mesh morphing to project the computational grid onto CAD.
- Perform parameter-free shape optimization using RBF mesh morphing through the Biological Growth Method (BGM).
- Perform mesh morphing of a model available in Mechanical APDL.

Course Overview

How to install & use Ansys RBF Morph Fluids.

Understand what radial basis function (RBF) mesh morphing is and learn

Learning Outcome

Following completion of the course, you will be able to:

- Install & independently use RBF Morph Fluids.
- Navigate the RBF Morph material.
- Understand & use the basic tools of RBF Morph Fluids.
- Use mesh morphing to project the computational grid onto external surface file (STL).
- Perform parameter-free shape optimization using RBF mesh morphing and adjoint.
- Perform mesh morphing for FSI analysis.

In both courses your learning outcome will provide you with how to:

- Set up a mesh morphing cases independently on a new computational grid.
- Perform parameter-based shape optimization using RBF mesh morphing and generate Response Surfaces based on shape parameters.
- Use the shape parameters created by RBF morph in Ansys optiSLang.
- Create shape parameters to build a static ROM using Ansys Static ROM Builder.



Simq - “We are thrilled to announce that Simq has received its first CE mark for Simq OSA!” **Obstructive sleep apnea** (OSA/OSAS) is a life-threatening and life-shortening disorder that affects more than 900 million adults worldwide. In collaboration with clinical partners, Simq has developed a medical device that supports the diagnosis of severe snoring and OSA as well as the selection of the appropriate therapy – Simq OSA.

Simq OSA - The Simq OSA software provides assistance in the diagnosis by visualizing sleep-related breathing disorders. Simq OSA creates a numerical model of the anatomical situation of the patient’s upper airway. For this purpose, Simq OSA performs a simulation of the airflow using numerical calculation methods. From this, Simq OSA provides an evaluation and visualization of fluid mechanical parameters and derived characteristic values for the representation of anatomical and physiological factors to support the specialist staff.



Simq OSA at a glance - Target: Patient-specific Identification of anatomical causes for severe snoring and OSAS

- Objectify the diagnosis through numerical simulation of pharyngeal airflow
- Identify and localize anatomical reasons for the sleep-related breathing disorder
- Visualization of the patients' situation with physical simulation
- Evaluation and support of different treatment options
- CE mark received Q2/2024
- Pre-clinical studies for MAD and orthognathic surgeries in progress

What is Sleep Apnea: The spectrum of sleep-related breathing disorders ranges from disturbing habitual snoring (rhonchopathy) to central sleep apnea to obstructive sleep apnea (OSA) to obstructive sleep apnea syndrome (OSAS).

While snoring occurs commonly in the general population, habitual or heavy snoring is not normal and is the primary symptom of OSA. The obstructive sleep apnea is characterized by repetitive breathing pauses during sleep.

These pauses (apneas) are caused by a collapse of the pharynx at inspiration when the air pressure in the upper airway drops below the ambient pressure. The apnea can last from a few seconds to several minutes until the patient eventually awakens to resume breathing. In general, obstructive sleep apnea is a chronic condition that does not go away on its own. Central sleep apnea occurs because your brain doesn’t send proper signals to the muscles that control your breathing and is less common than obstructive sleep apnea. Some studies showed a correlation of central sleep apnea and anxiety. The obstructive sleep apnea syndrome (OSAS) is associated with additional daytime symptoms such as chronic fatigue and excessive daytime sleepiness (EDS). Questions and Answers are continued on the website including:

What is the best treatment for sleep apnea? The principle of personalized medicine comes into play in the treatment of OSA patients. One of the difficulties in treating OSA is the fact that the location of the airway collapse varies from patient to patient and cannot be predicted without a more in-depth analysis of the airway geometry. Therefore, medical simulation of the upper airway is gaining significant interest in diagnosing and treating OSA. Simq is developing a medical software called Simq OSA, a physics-based modeling methodology that allows to significantly reduce the time required to provide a diagnosis and select an appropriate therapy, as well as to increase the success rate of the selected treatment.



I learned of a great YouTube Channel - the videos are free and created by Dr. Mehran Andalibi - Dr. Mehran Andalibi put a lot of time, effort, and expertise into these lesson videos.

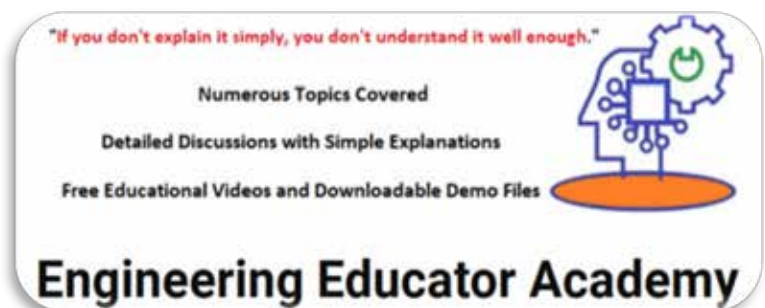
The town thanks Shiva Omidzadeh for posting the YouTube channel on social media.

YouTube ENGINEERING EDUCATOR ACADEMY



Dr. Mehran Andalibi has been working in higher education since 2008. He created this YouTube channel in 2021 (not 2009) as **a free classroom**

backup. He holds several CAD, Simulations, and programming certificates, including CSWE.



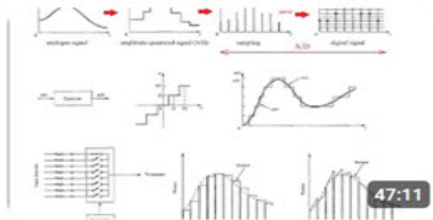
Courses to be covered:

- CAD (SolidWorks, CATIA)
- MATLAB
- Statics, Solid Mechanics, Machine Design
- Dynamics (Linear, Nonlinear, Mechanism)
- Controls (Classic, State-Space, Optimal, Nonlinear, Adaptive, Digital, Robust)
- System Identification
- - Robotics
- Engineering Mathematics (Numerical Analysis, Linear Algebra, Statistics, Probabilities, Optimization, Complex Numbers, PDE's, Series, Trigonometry)
- Microsoft Excel
- Technical Drawing, GD&T
- - Image Processing, Computer Vision, OpenCV

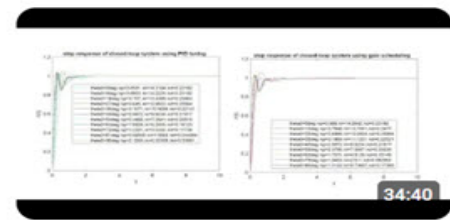
Among the many videos on YouTube



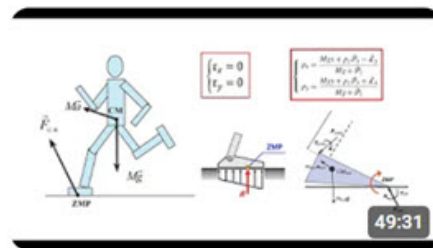
Z Transform and Inverse Z Transform



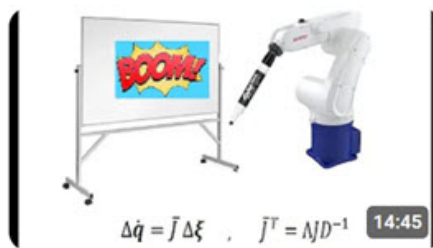
Digital Control Basics (D/A, A/D, S/H, ZOH, FOH, Quantization, Multiplexer)



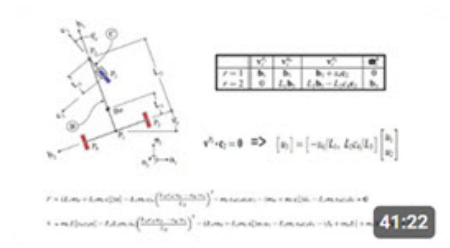
Gain Scheduling Control



Zero Moment Point (ZMP) in Legged Robots



Collision of Robot End-Effector with a Rigid Body in Workspace



Kane's Method Example: EoM's for a Shopping Cart with a Castor Wheel



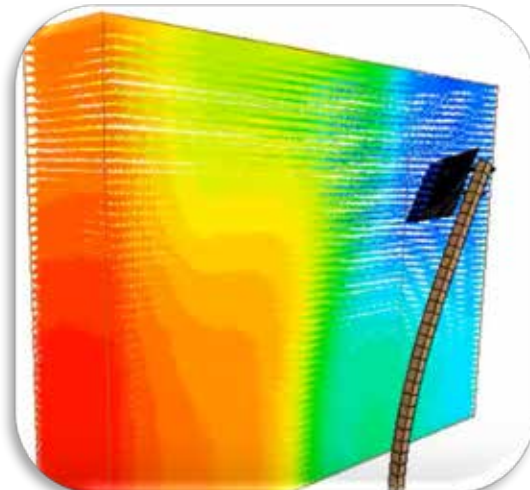
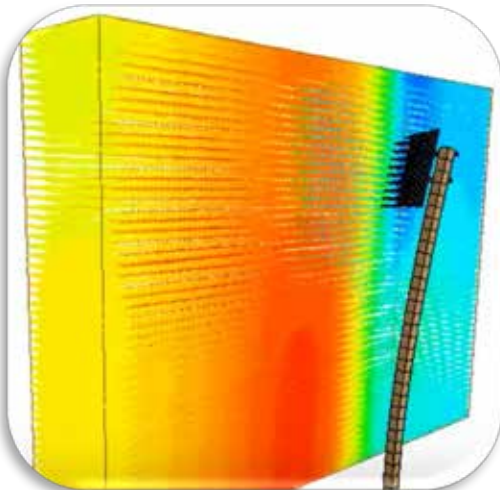
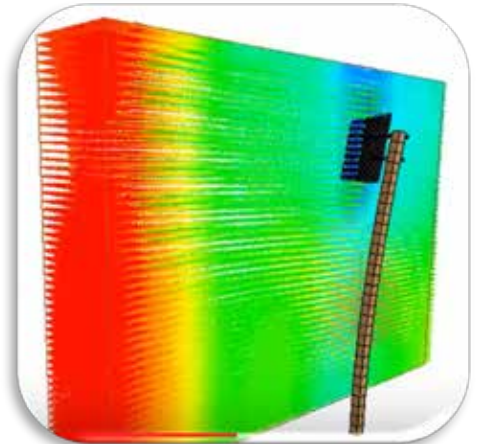
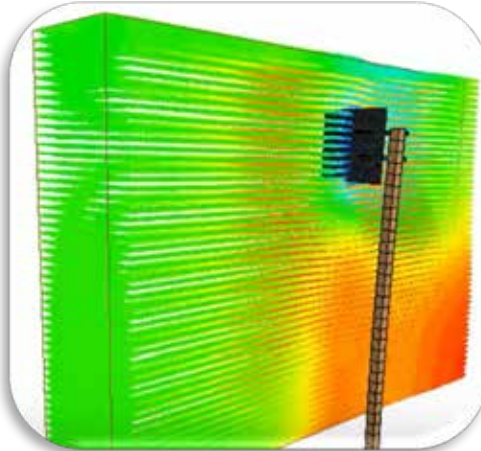
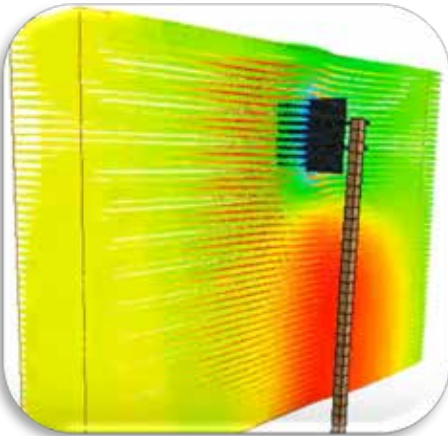
Monthly simulation choice.

"Katy questioned me, "Why do you only wear faded blue colors?" I answered, "I'll buy a colorful shirt you'll like."
Katy asked, "How did you know I like lots of colors?"
I answered, "Just a guess. Let's watch this simulation."

LS-DYNA Multiphysics channel on YouTube.



YouTube – [Traffic sign deflection](#)





Livermore, CA - LLNL - Lawrence Livermore National Laboratory's (LLNL) space hardware team has delivered a payload for NASA's Pathfinder Technology Demonstrator-R (PTD-R) satellite. LLNL developed the optical payload, called Deep Purple, that utilizes a new design for an ultra-violet (UV) and short-wave infrared (SWIR) monolithic telescope.



LLNL delivers compact dual-band telescope for launch this summer - Stephen Wampler

In January 2024, the Space Hardware team fully qualified its Deep Purple payload, which will be on board NASA's Pathfinder Technology Demonstrator-R, scheduled to launch this summer. Once operational, Deep Purple will observe ultraviolet and short-wave infrared light.
(Photos: Garry McLeod)

The mission will demonstrate simultaneous monolithic UV and SWIR optical sensing from space for the first time via two co-boresighted, 85 mm aperture monolithic telescopes using a new compact custom electronics module and a novel, lightweight, carbon-composite optical housing and radiator. It will demonstrate new possibilities for scientific observations and real-time space domain awareness.

The satellite is scheduled to launch this summer aboard SpaceX's Transporter-11 mission from Vandenberg Space Force Base in California. Rideshare provider SEOPS has handled the integration and mission services for the spacecraft.

Designed, developed, qualified and delivered in roughly one year for less than \$1 million, the Deep Purple telescope also will observe UV and short-wave infrared light from high-UV stars and the galactic bulge.

LLNL's monolithic optics are a novel line of compact Cassegrain telescopes constructed out of a single piece of fused silica. This design allows for a very compact, shelf-stable and resilient space telescope that can endure the harsh environments of a rocket launch and outer space.

"The optical package also is highly configurable, which gives us the ability to mix and match different sensors and optics within the same infrastructure to meet a variety of mission needs using a standardized small-satellite bus," said Jordan Smilo, the LLNL Deep Purple principal investigator and space hardware lead mechanical engineer.

"Deep Purple serves as an example of how the Lab's Space Program combines the R&D nature of LLNL with the deployment of innovative technology and its national-security mission at heart. Each satellite provides an opportunity for development and flight heritage for the nation's increasing need for responsive payloads.



Deep Purple's dual optical module and electronics are contained in a 25 centimeter x 15 centimeter x 10 centimeter package. LLNL lead mechanical designer Darrel Carter developed the overall design and assembly for the Deep Purple payload.

He is shown verifying the final mechanical torque on the assembly. In the background are Jordan Smilo, the Deep Purple project manager, and electrical engineer Princess Corral.

"We believe Deep Purple will be the smallest space telescope providing both SWIR and UV imaging in space," said John Ganino, associate program leader for space hardware at the Laboratory and system engineer lead for Deep Purple.

"This satellite is a 6U-sized space vehicle [the volume of six 10-centimeter CubeSats], so the size and mass allowed for Deep Purple is very strict. The Deep Purple payload couldn't weigh more than 5 kilograms (about 11 pounds) maximum. We also had the added challenge of incorporating our own electronics control module within the same volume," Smilo said.

To make the payload small and lightweight enough to meet these requirements, the team redesigned the electronics module to exactly fit within the available space adjacent to the optics.

"We also traded the heavier invar material, a nickel-iron alloy, that's typically used for optical housings for a novel, lightweight, carbon-fiber-nano-tube-composite housing. This made a huge difference in terms of keeping the satellite light, reducing the cost and production time while maintaining optical performance. We met the maximum mass for our entire payload with margin," Smilo said.

Once operational, Deep Purple will simultaneously observe the UV and SWIR light from high-UV stars and the Milky Way's galactic bulge. Such simultaneous imagery gives way to observing time-domain astronomical events, such as Fast Blue Optical Transients (FBOTs), a phenomenon recently discovered and yet to be understood.

Deep Purple also will attempt to demonstrate real-time space domain awareness using these unique sensing bands. The Space Program at LLNL continues to demonstrate its leadership in developing and delivering small satellite tools and capabilities.

"Deep Purple may be small — not much bigger than a loaf of bread — but the information it will reveal for the first time could make a huge impact on space-domain awareness. The team's ability to deliver such an incredible tool in such a short amount of time, while meeting NASA's rigorous requirements is another impressive achievement for the Lab's space program," said Ben Bahney, program leader for the space program at Lawrence Livermore. "Our list of achievements continues to grow. It's an exciting time."

NASA's Small Spacecraft Technology program, based at NASA's Ames Research Center in California's Silicon Valley and within the agency's Space Technology Mission Directorate in Washington, funds and manages the PTD-R project.



Where should you be in October? At the International LS-DYNA Conference.
Be there, or be square (My Mother's old fashion expression)
An engineer couldn't resist updating the expression.
Be there, or be a quadrilateral (I had to share that – he knows who he is!!!)

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



Start packing! You're 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

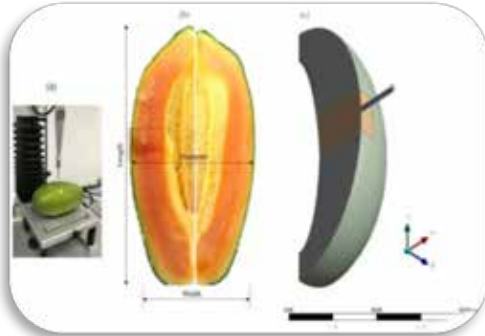
- Paper Acceptance Notification | July 1, 2024
- **Final Paper & Presentation Due | September 31, 2024**

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:
 - 20 minutes for presenting
 - 5-10 minutes for Q&A.
- Recorded presentations may be considered if you are unable to attend in-person.



MDPI – Excerpt - This study aims to develop a finite element (FE) model to determine the mechanical responses of Exotica papayas during puncture loads. The FE model of the puncture-test was developed using the ANSYS 19.1 software... Therefore, this study aims to develop a three-dimensional (3D) FE model to simulate the probe-papaya interaction during puncture test using the ANSYS software. The present study focuses on developing an FE model to predict the mechanical response of papaya, with the effect of different puncture velocities.



MDPI – Web - [Finite Element Modelling for Predicting the Puncture Responses in Papayas](#) - N. Zulkifli, N. Hashim, H. Harith

1. Dept. Biological & Ag. Engin., Faculty of Engin.
Univ. Putra, Malaysia,
2. SMART Farming Tech. Res. Ctr., Faculty of Eng.,
Univ. Putra, Malaysia
3. Dept. Ag. & Food Engin., Faculty of Engin.,
Univ. Uyo, Nigeria
4. Malaysian Ag. Res. & Dev, Inst, Malaysia

Excerpts

Abstract - The proposed framework combined the finite element method and statistical procedure to validate the simulation with the experimental results. Assuming the elastic-plastic behaviour of papaya, the mechanical properties were measured through tensile test and compression test for both skin and flesh. The geometrical models include a quarter solid of papaya that was subjected to a puncture test with a 2 mm diameter flat-end stainless-steel probe inserted into the fruit tissues at 0.5 mm/s, 1 mm/s, 1.5 mm/s, 2 mm/s, and 2.5 mm/s. The FE results showed good agreement with the experimental data, indicating that the proposed approach was reliable. The FE model was best predicted the bioyield force with the highest relative error of 14.46%. In conclusion, this study contributes to the usage of FE methods for predicting the puncture responses of any perishable fruit and agricultural products.

1. Introduction - Papaya is one of the commercial fruits that is widely planted in most tropical and sub-tropical countries. Yet, the average post-harvest losses reported for papaya in Malaysia is estimated at around 44% each year [1]. Therefore, the availability and accessibility of the papaya must be increased by reducing the number of post-harvest losses. Reduction in these losses would increase the number of fruits available for consumption and thus leads to growing consumer demand. This can be achieved by maintaining the textural quality and improving the shelf-life of the papaya during the handling process, mainly during the distribution from farm to retail.

Papayas are often exposed to deterioration of physical structure caused by rough handling during post-harvest operations. The area or spot of impact can then serve as infection sites for numerous wound pathogens that result in many severe diseases [2]. These spots, even without infection by pathogens, are unsightly and cause moisture loss and excessive shrivelling [3,4]. Besides, the textural property of fruits may decline greatly during the post-harvest supply chain. For instance, exposure to cold temperature reduces the respiration rate and induces the effect of shrinkage of the fruit's skin [5]. Since papaya is consumed after peeling, not only is its freshness reduced but it also becomes prone to desiccation leading to spoilage...

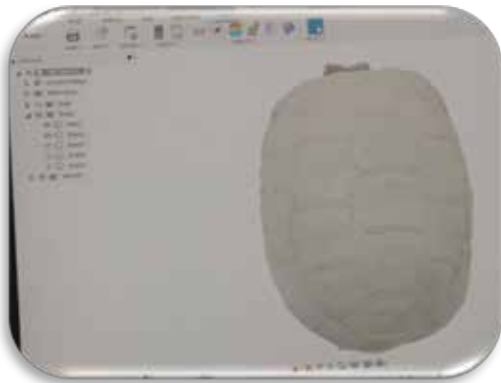


Autodesk – From video, “Hardshell Labs has developed a solution: a 3D-printed, baby-tortoise-size “Techno-Tort” that lures the birds then deters them with a puff of methyl anthranilate, more commonly known as grape flavoring. Preliminary studies show it’s working, with a 46% reduction in raven return. Hardshell Labs has received a grant from the National Science Foundation and a Roosevelt Genius Prize to continue its work.



AutoDesk – Web - [In Southern California’s Mojave Desert, ravens are increasing in number and preying on baby desert tortoises, decimating populations.](#)

Below is the transcript from the video – please view the video on the website for complete information and the amazing use of the 3D printed tortoises.



Transcript - video on website:

Tim Shields, conservation biologist, Hardshell Labs : I always knew I wanted to be a field herpetologist. I met a tortoise when I was 14—a wild tortoise. That was my first one and it really struck me. I stumbled into this role as a tortoise research biologist as a consequence of spending 30 years on the same project, whose focus was to track population changes—well, the population changes were all negative.

[Shields points to a sign about the desert tortoise and begins reading it aloud.] “The natural area has about 200 tortoises per square mile.” It does not. That [sign] is nostalgic to me.

It was right off the bat that we knew ravens were killing a lot of baby tortoises. There are so many ravens, and so few tortoises now, that the odds of a juvenile tortoise making it in the West Mojave are pretty dim. There’s a fairly simple mathematical relationship. More humans equals more ravens equals fewer tortoises. For years, my technology for raven control was chasing after them and throwing rocks at them.

We had this idea of, how do you make a fake tortoise? And then I meet this crazy kid, Frank Guercio, who just has this incredibly absorptive mind.

I provided the impetus—try to make a convincing fake baby tortoise—and he took off with that.

Frank Guercio, engineer, Hardshell Labs : If I were going to describe the field or the industry, I guess you could call it “conservation technology.” It’s new. It hasn’t existed before now. In my tenure with Tim thus far, I’ve built tortoises; I’ve built rovers; I’ve built egg oilers and lasers. I’ve produced tortoises of different sizes and different shapes and different species. I love this stuff. If I’m not 3D printing, if I’m not solving these problems, if I’m not designing, I get hives. I can’t stay still. If I want there to be tortoises in the future, as a designer, I have to find the solution.



Shields: The driving force behind this project is aversive training. There is a chemical called methyl anthranilate—it's artificial grape flavoring. For whatever reason, artificial grape flavoring drives birds crazy, including ravens.

Guercio: The idea is that on the inside of either of these [Guercio holds two 3D-printed tortoise shells], we have a bladder.

Shields: As soon as [the Techno-Tort] gets hammered on, there's an accelerometer that says, "I'm being hammered on," so that at this very moment when the raven's beak is right in here, all the sensitive tissues are right there. The thing just goes poof, like that. Our bet is that it's going to be a sufficiently terrible experience. The raven is taught to leave live tortoises alone. Dealing with ravens, you got to be careful because if they figure out what the game is, the game is over. I have always erred on the side of greater accuracy—a more convincing fake baby tortoise.

Guercio: This is printed at a resolution of roughly 50 microns, or one 500th of a millimeter.

Shields: This is startling progress, and that's because he just won't let it rest. It's really good to work with obsessives.

Guercio: Being able to import really complex geometries like an organic shape, like a tortoise, is very difficult to do in any sort of industry program. When it comes to the tortoise specifically, there was so much legwork on the back end to get it into a position where I could then mechanically edit it as an object. [Autodesk] Fusion 360 has been a fantastic tool. The second I became familiar with Autodesk products and really had them available to me, it really opened up the floodgates. We can create structures inside of the tortoise that was next to impossible about five years ago.

Shields: If a certain number of ravens have the bad experience with the Techno-Tort, we should see a reduction in the frequency of attacks.

Guercio: Having seen tortoises get ripped limb from limb, and then seeing one fight back was really cathartic. I've always been a member of the Mojave, and it is a harsh and unforgiving place. But this is where I found myself. We're sitting in a space that three months from now is going to have 100 printers, filament production lines, resin printers, CNC machines, laser cutters, anything and everything that can be used to solve the problem. How many kids up here have access to a 3D printer or an opportunity to work with the Bureau of Land Management or save the tortoise? Leveraging this opportunity with Tim to save the world and species into having an immediate effect on my locale, I think that's just the first step.

Shields: We already think we're having a positive effect.

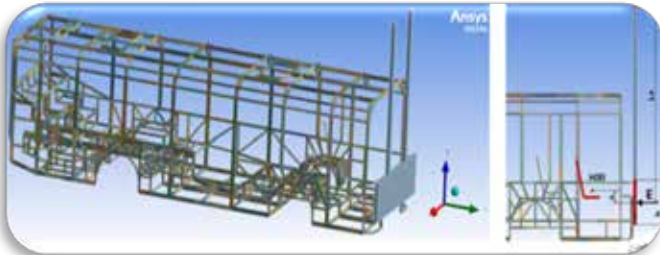
Guercio: We're almost at this jumping off point where we'll be able to apply what we're creating here to the rest of the world's problems, too.

Shields : Conservation biology is a pretty hopeless endeavor generally right now. So the provision of hope to the conservation community is really important to me personally.

Guercio: There's nothing more satisfying—nothing in the world—than seeing something that you've made make a difference.



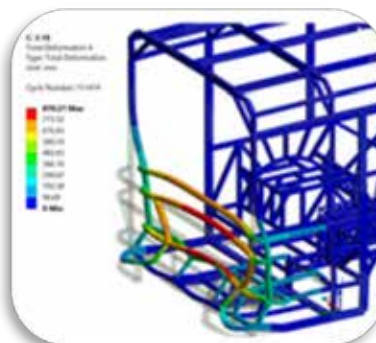
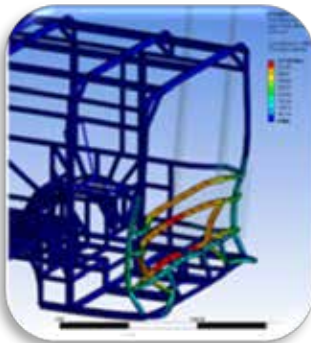
Excerpts: "...An interesting approach to the crashworthiness analysis & design of a sandwich composite of an electric bus in a full-frontal impact was presented in [10]—**the behavior of the bus during a full-frontal collision simulation was thoroughly investigated using LS-DYNA. ...The LS-DYNA environment was used in the modeling research** [12]. ...The authors built a thorough finite element model & used the large deformation finite element analysis method & LS-DYNA dynamic analysis software (Ansys 2023 R1) to simulate impact under the three



MDPI – Web [Validation of Frontal Crashworthiness Simulation for Low-Entry Type Bus Body According to UNECE R29 Requirements](#)

by K. Holenko, O. Dykha, E. Koda, I. Kernytsky, Y. Royko, O. Horbay, O. Berezovetska, V. Rys, R. Humenuyk, S. Berezovetskyi, M. Żółtowski, A. Markiewicz and T. Wierzbicki

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- Dep. Equip. Design&Operation, Inst. Mech.Engin.&Transport, Lviv Poly. Nat'l Univ. Ukraine
- Faculty Mech. & Power Engin, Lviv Nat'l Univ. Nature Mgt, Ukraine

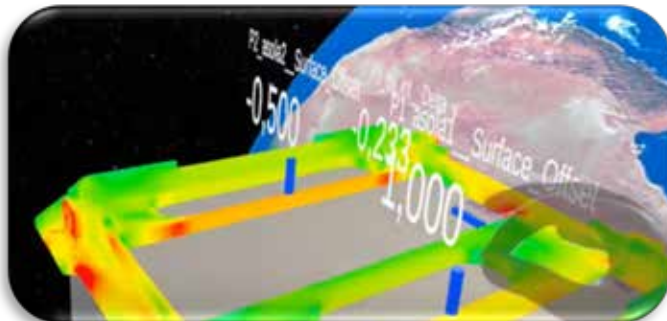
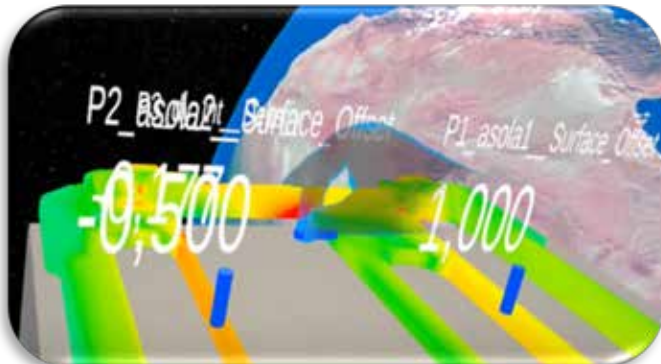
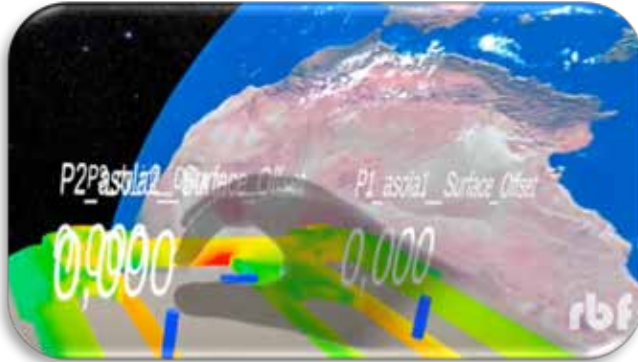


Abstract Frontal crash tests are an essential element in assessing vehicle safety. They simulate a collision that occurs when the front of the bus hits another vehicle or an obstacle. In recent years, much attention has been paid to the frontal crash testing of city buses, especially after a series of accidents resulting in deaths and injuries. Unlike car manufacturers, most bus bodybuilders do not include deformation zones in their designs. The next two regulations are widely used to assess whether a structure can withstand impact loading: UNECE Regulation No. 29—United Nations Economic Commission for Europe (UNECE R29) and the New Car Assessment Program (NCAP), which is more typical of car crash tests. The main goal of the research is to develop an applicable methodology for a frontal impact simulation on a city bus, considering UNECE R29 requirements for the passenger's safety and distinctive features of the low-entry body layout. Among the contributions to current knowledge are such research results as: unlike suburban and intercity buses, city buses are characterized by lower stiffness in the event of a frontal collision, and therefore, when developing new models, it is necessary to lay deformation zones (currently absent from most city buses). Maximum deformation values in the bus front part are reached earlier for R29 (137 ms) than for most impacts tested by NCAP (170–230 ms) but have higher values: 577 mm vs. 150–250 mm for the sills tested. Such a short shock absorption time and high deformations indicate a significantly lighter front part of a low-entry and low-floor bus compared with classic layouts. Furthermore, it is unjustified to use the R29 boundary conditions of trucks to attach the bus with chains behind its frontal axle both in natural tests and appropriate finite element simulation—the scheme of fixing the city bus should be accordingly adapted and normatively revised.



RBF Morph – The RBF Morph team has developed an app designed to optimize CubeSat mass budgets, allowing for interactive changes to window sizes and plate thicknesses with real time stress updates.

Experience high-fidelity simulations in VR with our latest video showcased below.



YouTube - [Discover How Virtual Reality is Transforming Structural Analysis](#)

CUSP is a constellation of two 6U CubeSats designed to measure the polarization of hard X-rays (25-100 keV) emitted by solar flares, which cause damage to electronic devices in orbit (satellites) and on Earth.

Learn how this was accomplished:

- Istituto Nazionale di Astrofisica (National Institute for Astrophysics)
 - IAPS (Institute for Space Astrophysics and Planetology)
- in cooperation with the University of Rome, are conceiving and optimizing the design of the Cubesat Solar Polarimeter (CUSP)

This cutting-edge solution is now available on MetaQuest3, featuring:

Wireless, Controller-Free Interaction:

Enjoy the freedom of hands-free controls.

AI-Powered Precision:

Our digital model boasts 1% accuracy compared to full FEA high-fidelity computations.

Advanced Data Integration:

AI training data is generated using the Ansys Mechanical FEA solver and RBF Morph Structures, with data compression handled by Ansys Twin Builder and FMUs for data exchange.

Enhanced Visuals:

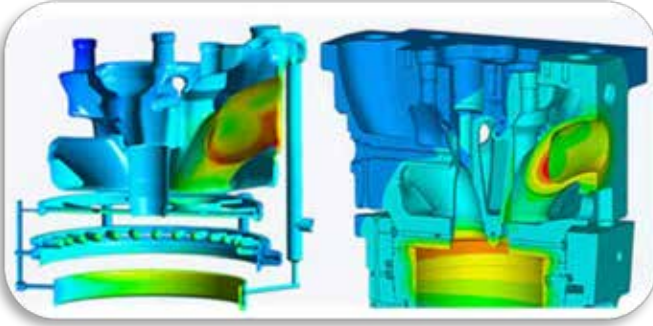
The updated video includes enhanced texture calculations for mesh representation of Von Mises stress and an immersive Earth backdrop.



CADFEM India: Did you know that MAN Diesel SE develops and produces marine engines. They commissioned CADFEM with the thermomechanical analysis of a cylinder head for a marine engine using FEM and CFD simulation.

Ansysis CFD and FEM analysis of a marine engine cylinder head

Images: © MAN Diesel SE



(left) CFD result of the temperature distribution of the cooling liquid

(right) The temperature distribution inside the structure after mapping from CFD to FEM

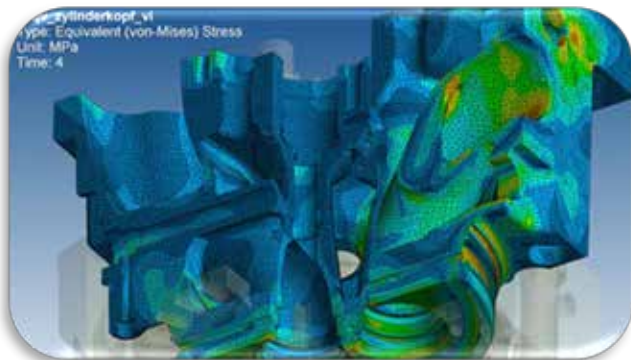
CADFEM – Web -[Thermomechanical analysis of a cylinder head](#)

Sector: Machinery and plant engineering
Specialist field: Structural mechanics

Task - Modern engine development must reconcile economic aspects with high technological standards. Development at MAN Diesel SE aimed to reduce the weight of a marine engine with a new design. CADFEM used Ansys simulation tools to check whether the more efficient design of the cylinder head could withstand the loads and achieve a comparable service life despite the lower weight. This would significantly increase the economic efficiency.

Solution - **A CFD analysis with Ansys CFX** covering the cooling and combustion process determines the thermal behavior within the engine and provides the basis for a subsequent stress analysis. This mechanical analysis implies several load cases describing the combustion cycle, as well as temperature-dependent material properties and nonlinear contacts in a comprehensive finite element model. This was followed by a durability analysis.

Customer Benefit - The complex analysis of the engine behavior provides information about the contact pressure and possible gap formations in the combustion cycle. This information is used to rule out undesirable effects on the thermomechanical behavior of the engine and its individual parts as early as the design phase.



Equivalent (von Mises) stress distribution in the cylinder head with complete combustion in the combustion chamber



I found a blog article I'd like to share with you by Chaitanya Babu Suryadevara

Excerpt, "In today's world, we are surrounded by technology more than fellow humans. Think about it, even when you are enjoying your solo time at the end of a long, productive week, there is bound to be at least one technological innovation — that could be your mobile device or a music player."



LTTS – web - [Semiconductors: Fueling Innovation Across Industries](#)

**By Chaitanya Babu Suryadevara,
Senior Delivery Manager, LTTS**



What is that one element that connects all things technology from radios and cameras to computers and vehicles? Semiconductors.

These minute electrical components are the building blocks of today's digital era, powering a wide range of technologies across multiple industries such as manufacturing, telecom, multimedia, and automotives. Semiconductors not only enable new innovations but also enhance the functionality of devices by making them more compact, powerful, and cost-effective.

Powering The Internet of Things - The Internet of Things (IoT) domain relies heavily on semiconductor technology. All IoT devices — ranging from smart home appliances, such as refrigerators and thermostats, to connected industrial machinery — depend on semiconductors for connectivity, processing power, and data storage.

The efficient functioning of IoT networks relies on the reliability and advancements of semiconductor technology, which not only supports everyday conveniences but also drives digitalization in various sectors like healthcare, transportation, and energy management.

Driving the Automotive Industry - Over the years, semiconductors have become integral to the evolution of the automotive industry. They play a critical role in enhancing connectivity, entertainment, safety, and performance of vehicles. Advanced Driver Assistance Systems (ADAS), for example, which offer features like automatic parking, lane tracking, and collision avoidance, rely on semiconductors for their operation. Additionally, modern infotainment systems that provide navigation, streaming services, and real-time traffic updates are heavily dependent on semiconductor technology.

Moreover, semiconductors are fundamental in the development of electric vehicles (EVs), contributing to efficient battery management and power distribution. Automotive OEMs are now leveraging semiconductor technologies to bring autonomous cars from science fiction to reality. Semiconductors enable vehicles to process vast amounts of data from sensors and cameras, allowing them to navigate complex environments and make split-second decisions. The ongoing advancements in semiconductor technology promise to drive further innovations, transforming the future of transportation.



Pioneering Multimedia Experiences - The rich multimedia experience that we enjoy on our devices is also powered by semiconductors. From captivating graphics to high-definition audio and video, semiconductors work behind the scenes to make everything possible. Think about features like GPU-accelerated rendering for lifelike graphics, or audio codecs that deliver crisp sound — all these come down to advanced semiconductors working in harmony with software.

Semiconductors also play a crucial role in cameras in enhancing image processing to deliver stunning photos and videos. Moreover, semiconductors enable seamless connectivity, allowing us to stream content, play online games, and communicate with others in real-time. Without these tiny yet powerful components, the sophisticated functionalities we take for granted in our gadgets would not be possible.

Revolutionizing Windows Platforms

Semiconductor technology also plays a significant part in optimizing and enhancing the performance of Windows platforms. It aids end-to-end — from Windows Platform validation and debugging to telemetry and customer bug fixes. By ensuring that the underlying hardware works seamlessly with the software, semiconductors ensure smooth operation of the system. Semiconductors enable seamless device driver testing, multimedia, and performance validation and analysis, which are essential for maintaining system integrity and performance. This technology not only ensures efficient and reliable system operation but also supports the development of innovative features that enhance user experience.

Additionally, the advancements in semiconductor technology contribute to improved power efficiency and longer battery life in devices, making them more sustainable and user-friendly.

Final thoughts

To encapsulate, semiconductors are the unsung heroes of our digital age. They are the underpinning technology that powers various industries, enabling them to constantly innovate and offer improved products and services. As technology continues to advance, semiconductors will undoubtedly play an even more predominant role in shaping the future of our digital world.

So, the next time you use your smartphone, drive a car, or watch a high-definition movie, remember that it is all made possible by semiconductors. Let us take a moment to appreciate the transformative role of semiconductors in our lives and be excited for what lies ahead.

The future is indeed bright with semiconductors leading the way towards a more interconnected, efficient, and sustainable world.

Let us embrace it together.

**News: CADFEM: (D-A-CH)**

I viewed a simulation on YouTube from an engineer's perspective.
I especially like this simulation. Join me viewing Episode 5.

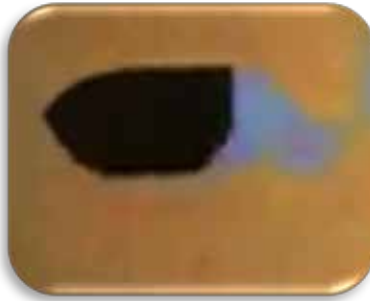
**YouTube Simulation Episode 5**

Never mess with a???

**When people ask, what a simulation engineer does,
it is very difficult to explain in one sentence.**

But when you show it in the simulation video below that is on our YouTube Channel, it is immediately understandable and you see things from a different perspective.

Below you can see an example of a movement with minimal resistance and minimal energy input. At a speed of 2.5 m/s through water. Never mess with a ...??? Watch to the end! CFD simulation is so cool.



Never mess with a penguin

A must see, not to miss, engineers' perspective - episode 5



D3View – “Have you heard about FORA? FORA is d3VIEW’s new AI agent for your assignments. It acts as an experienced colleague. You can ask it to configure, build, and execute workflows, as well as to evaluate and optimize designs. The D3View website has comprehensive graphics, videos, and explanations for their new AI agent.”



Speed Through Tasks with FORA - [AI Agent FORA for Executing Platform Functions](#)

Your experienced colleague, FORA, knows the ins and outs of what’s available on the d3VIEW platform. Now, let’s meet FORA.

Utilizing FORA you can request assistance to learn how to create a workflow or seek help with material laws in LS-DYNA.

Can you list some laws that are applicable to model steels?

Several laws and criteria are applied in the modeling of steels using LS-DYNA, ensuring accurate and efficient simulation of their mechanical properties under various conditions. Here are some applicable laws and criteria:

1. **Cowper-Symonds Strain Rate Model:** This model is frequently used to account for the rate effects on yield stress. The parameters C and P are used to describe the strain rate sensitivity of materials, providing a scaling factor for the yield stress based on the strain rate[1].
2. **Johnson-Cook Plasticity Model:** This popular model includes strain hardening, strain rate hardening, and temperature softening effects. It is particularly useful for high-rate deformation scenarios like metal forming, ballistic penetration, and automotive crash simulations .
3. **Modified Piecewise Linear Plasticity (MAT_123):** This is an advanced elasto-plastic material model that includes rate dependency and failure criteria based on effective plastic strain, plastic thinning, and principal strain components.

If I have a tensile stress vs strain curve, what models are available for steel?

If you have a tensile stress vs. strain curve for steel, the following material models in LS-Dyna would be suitable:

1. **MAT_024: Piecewise Linear Plasticity:** This model is ideal if you have a tensile stress vs. strain curve. It allows for defining multiple points on the curve to accurately capture the material behavior. The model accommodates both elastic and plastic regions and accounts for strain-rate effects using the Cowper-Symonds model .
2. **MAT_018: Power Law Plasticity:** This model uses a power law for hardening and is suitable for materials where you have a stress-strain relationship defined by a power-law equation. It's useful when you have a simplified curve fitting your material data .
3. **MAT_081/MAT_082: Plasticity with Damage and Orthotropic Option:** These models allow for defining an arbitrary stress vs. strain curve and include damage and failure criteria. They are suitable for more advanced modeling where detailed damage evolution is needed .



Workflow Builder

Interact with FORA to create workflows including viewing and processing curves.
Alternatively, request worker recommendations from FORA for specific tasks.

Design Evaluator and Optimizer

- **Instruct** FORA to help you explore Simlytiks.
- **Utilize** FORA to upload data, conduct analysis on it, and interact with it.
- **Gain** deeper insights into your data.



D3View has a comprehensive library of visualizers.

You can instruct FORA to visualize data from the vast library of visualizers.

AI Support is at Your Fingertips

**d3VIEW FORA is here to support your business processes,
giving you the ability to speed up design and development.**

[Contact Us to See FORA in Action!](#)





Learn more about the Reciprocal Frame structures in Slijk-Ewijk, The Netherlands, in our case study. Discover how SIDstudio used OasysGSA's structural analysis, design and interoperable capabilities for the successful creation of one residential villa and two holiday homes.

Intricate structural analysis of Reciprocal Frames using Oasys GSA

Photos by Michel Post (M.A.) – ORIO architecture

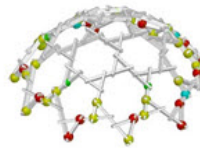
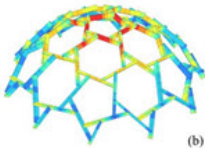
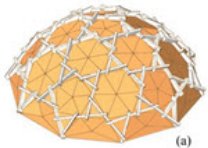
Project Overview - This project involved the structural analysis and design of three Reciprocal Frame structures in Slijk-Ewijk, The Netherlands. The project size consists of one residential villa and two holiday homes.



Together with the architect, Michel Post of Orio Architects, the client, Eric Bossink and Allinda Gerritsen Weustink, and SIDstudio a structural design was created. The team at SIDstudio were responsible for the complete structural and geometry design, they used Oasys GSA for the structural analysis.



The structure is still under construction because the clients are building the Reciprocal Frame structure almost completely by themselves. The villa in Slijk-Ewijk uses as many biobased materials as possible. **Roughly, the applied materials can be divided into the following parts: Foundation: concrete slab on piles and concrete soil retaining walls, Roof: Round unbarked chestnut timbers – locally sourced, Roof insulation: Straw bales – locally sourced Roof cover: moss sedum**



- Geometrical model
- FEM model in GSA
- Analysis of connections and members within Rhino using results from GSA

Reciprocal Frames (RFs) are feasible by circulating shear with compression or tension interactions between their constituent members. Beams do not meet at their ends but somewhere along their length. RFs can create planar to complex 3D surfaces. 3D shapes will increase the level of geometrical complexity drastically. When using straight elements, the curvature is created by using stacked connection details. This results in a large variation of details regarding angles of intersection, profile dimensions and forces to transfer.

Main goals of the project - The main goals of the clients Eric and Allinda for the project are to create "De Ottenburg" – a Bed & Breakfast or Eating Club – and mini campsite with a food forest in the making. They are currently working hard to transform the former orchard, on the Waal in Slijk-Ewijk, into a place where you can enjoy nature and eat what the country has to offer. In harmony with your environment, central to "De Ottenburg". They are achieving this by building completely energy neutral with environmentally friendly materials. They grow food in an organic way according to the principles of permaculture and ensure cooking is a social process with room for all kinds of experiments.



They promote a relaxed work environment where you can do something meaningful and learn something from it.

Eric and Allinda want to offer a “workplace” for people who find it difficult to find work in regular society and for children service at the B&B or in the kitchen. With this they want to give our “heroes” of healthcare a pleasant and meaningful daytime activity, without stress or extreme workload, in a friendly atmosphere.

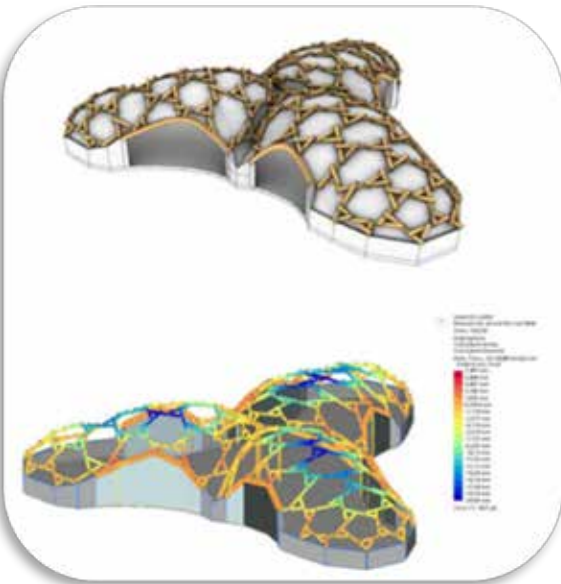


How Oasys proved invaluable - Due to the complex geometry of the structural design, the team at SIDstudio faced some challenges at the beginning of the project. Firstly, using round unbarked timbers for the construction was going to require detailed and accurate analysis and design results as they are not dimensionally stable.

Modelling the geometry of the Reciprocal Frame and the structural modelling of the finite element (FE) model along with detailing presented difficulties as it would need to be made buildable.

For this project a more manual approach was chosen. Watch the video below to discover how the team were able to conquer these challenges.

The use of structural analysis software, Oasys GSA, allowed the team to analyse the complete complex structural design of all timber roofs and assisted with modelling the reinforcement of the foundation. Without FE modelling, the team would not have been able to check the structural design considering the complexity.



“GSA is the software within SIDstudio that we use for all our structural analysis. It allows for complex 3D modelling and interacts very well with Rhino which allows for very complex 3D models.” – Tom Godthelp, Structural Engineer at SIDstudio

SIDstudio further developed the process of bringing detailed geometry to GSA by using the range of tools available. They began using and still use Geometry Gym and are currently exploring the GSA-Grasshopper plugin which allows for fast modelling of intricate structures and interacts seamlessly with parametric models. Tom further states, “GSA is very good in analysing complex structures. Rhino is very good in modelling complex geometry. Both software are being used in their strongest power and provide an excellent combination.”

We’d like to thank Tom Godthelp, Structural Engineer at SIDstudio, for sharing this work with us.

Find out more about the project on the website

Arup and Oasys Ltd. have been involved in barrier development for over 20 years, working in collaboration with Cellbond. These models take advantage of the latest developments in the LS-DYNA code and are designed to provide robust and efficient analysis.

**OZEN Engineering: Don't miss the blog by German Ibarra**

Did you know that the Discrete Element Method (DEM) is a computational approach used to simulate the dynamics of particulate materials? These materials, often referred to as bulk solids or granular media, consist of numerous individual solid particles. Examples of granular flows include the movement of grain in processing equipment, the transport of ore through mining apparatus, and the descent of sand in an hourglass.

**Ozen – Web - [Transfer Chute Analysis - Posted by: German Ibarra](#)**

The behavior of granular media can be intricate, as these materials may exhibit characteristics resembling solids, fluids, or a combination of both. For instance, sand flowing through an hourglass demonstrates fluid-like properties, while a pile of sand can display solid-like stress-strain characteristics.

A transfer chute is a crucial component in bulk material handling systems, commonly used in the mining industry to guide and control the flow of materials between different conveyor belts or from a conveyor to a storage facility.

These chutes are designed to efficiently transfer materials such as ore, coal, or other mined substances while minimizing spillage, dust generation, and material degradation. The design of a transfer chute takes into account factors like material properties, flow rates, drop heights, and impact forces to ensure smooth and controlled material transfer.

Transfer chutes typically consist of a head chute, where material enters from the discharging conveyor, and a tail chute, which directs the material onto the receiving conveyor or into a storage bin. The internal geometry of the chute is carefully engineered to control the flow path, reduce material velocity, and minimize wear.

Features such as impact plates, rock boxes, and deflectors may be incorporated to absorb impact energy, redirect material flow, and reduce dust generation. Modern transfer chute designs often utilize computational modeling techniques, including Discrete Element Method (DEM) simulations, to optimize performance and predict material behavior within the chute system.

In summary, understanding transfer chutes is crucial for optimizing particle flow in industrial processes. By considering material properties, chute geometry, and flow characteristics, engineers can design efficient transfer chutes that minimize issues and improve overall operational efficiency.

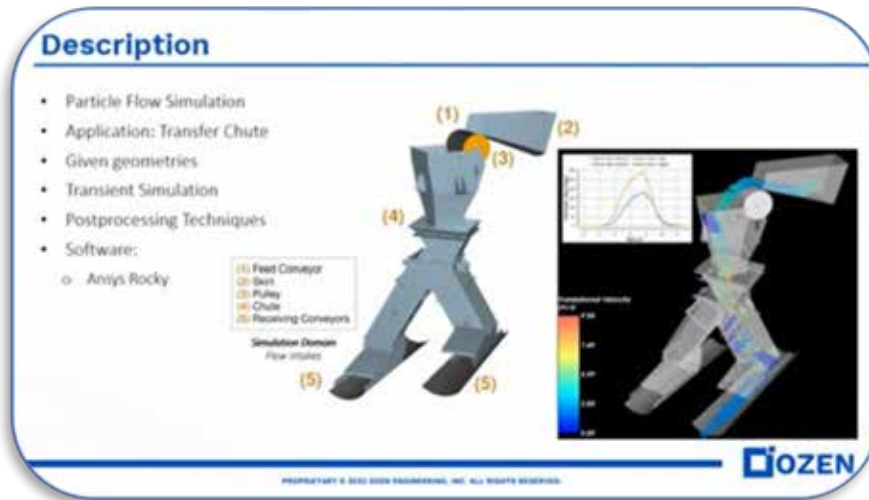
Example of application - In the video on the website, you will learn how to create a simulation of a Transfer Chute. Ansys Rocky is the package used to achieve results that will help assess some important operating aspects. The simulation follows the following steps: - The Discrete Element Method (DEM) is a computational approach used to simulate the dynamics of particulate materials. These materials, often referred to as bulk solids or granular media, consist of numerous individual solid particles. Examples of granular flows include the movement of grain in processing equipment, the transport of ore through mining apparatus, and the descent of sand in an hourglass.

The behavior of granular media can be intricate, as these materials may exhibit characteristics resembling solids, fluids, or a combination of both. For instance, sand flowing through an hourglass demonstrates fluid-like properties, while a pile of sand can display solid-like stress-strain characteristics.



Unlike traditional continuum-based methods, DEM does not rely on meshing or solving continuum equations of motion. Consequently, it doesn't require a predefined stress-strain constitutive law for the material. Instead, DEM simulates the interactions between individual particles, allowing the stress-strain relationship to emerge as a result of the simulation.

This particle-based approach enables DEM to capture complex granular behaviors that might be challenging to model using conventional continuum methods.



Example of application - In the video on the website, you will learn how to create a simulation of a Transfer Chute.

Ansys Rocky is the package used to achieve results that will help assess some important operating aspects.

The simulation follows the following steps

- Physics. Set physical conditions such as Gravity and Momentum (Rolling Resistance Model).
- Geometries. Import geometry components (STL format files).
- Motion Frames. Add and preview movement to the simulation components (Geometries).
- Materials. Define materials and set densities and other properties.
- Materials Interactions. Define adhesion and other properties for materials interactions (Particles-Particles, Particles-Wall material, Particles-Conveyor material).
- Particle information. Size, shape and assigned material.
- Inlets and outlets. Set up the location, mass flow rates and the range of time in which are enabled.
- Regions of Interest. Create a Cube region where custom calculations can be performed. Using planes will help to get useful graphs.
- Solver. Define how the DEM solver processes the simulation and collects data.
- Create animations. Select the set of transient results to make a video.



I recently read about the plenary speakers for the conference.

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

PLENARY SPEAKERS NOT TO MISS

B. Tickel - Cummins

W. Schamai - Danfoss

W. Marsden - Ansys

I. Tolchinsky - Ansys



The Conference aims to illuminate what's possible through the use of simulation.

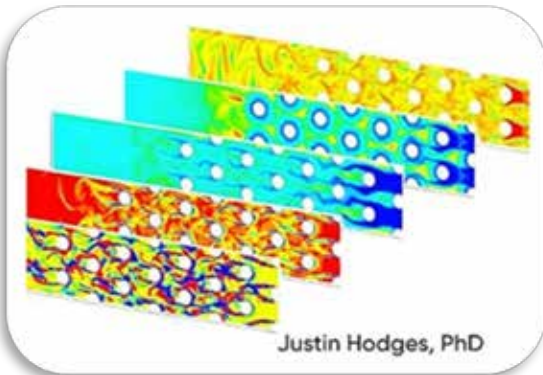
Among the agenda you don't want to miss you will find:

- 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.



I see that Dr. Justin Hodges published a book available on Amazon.

Justin explained, "This is not a traditional book. This is a monograph; a practical guide and crash-course to enable mechanical and aerospace engineers to complete machine learning projects on simulation data, from start to finish."



Amazon – Web - [Approaching machine learning problems in computational fluid dynamics and computer aided engineering applications: A Monograph for Beginners](#) by Dr. Justin Hodges (Author)

Who this book is for: If you are interested in ML for CFD/FEA/CAE, it's probably a fit for you. This is an abstraction of experiences into a practical guide to get CFD/CAE practitioners more comfortable in machine learning projects. After hundreds of requests for support, I felt the conviction to set aside my nights for 6 months and produce this book as a more scalable means to help.

This book has a lot of (easy to understand) code (not shareable on Github). There is an abundance of resources that cover theoretical knowledge of machine learning in 'the mainstream', but relatively little by comparison for CAE applications (especially few that are hands-on). My hope is that the reader already has some (very minimal) theoretical knowledge when they pick this book up. There will be some explanation on the algorithms with examples (in Python), and some degree of surveying/summarizing popular ones, but the primary focus is how and what you should do to solve machine learning problems. This is what I refer to as the pipeline of steps from start to finish in a machine learning project, which seems to have a steep learning curve (my motivation for writing this book). This book will also share my recommended learning pathway for CFD/CAE engineers to develop their AI/ML skills and portfolios and is great for beginners.

Recommendation Excerpts:

Framatome : Dr. Charbel Habchi, Mechanics & Thermal Hydraulics Analysis Engineer, R&D. "The book is very well structured, containing informative explanations, especially for beginners in the field. It covers the main steps of ML projects for CFD and CEA applications with some helpful examples"

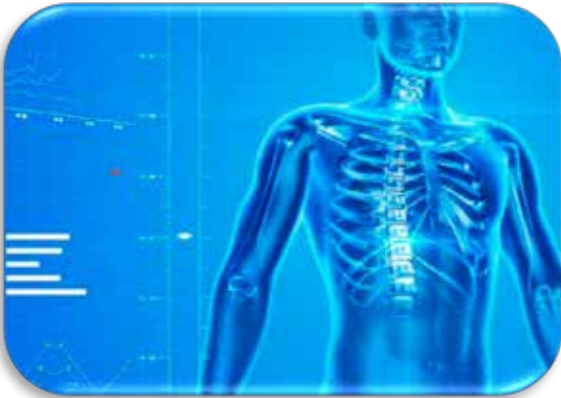
Siemens: Dr. Shinjan Ghosh, Research Scientist, "I believe that my longtime friend & colleague Justin Hodges, PhD has made a significant contribution in this area. No wonder it is already a best seller on Amazon." -

(Aero Thermal), Mercedes-Benz Research and Development: "This is the perfect guide to integrating AI and ML into your CAE or CFD simulations with Justin Hodges latest book, tailored for CAE engineering looking to expand their skills" - Rajat Walia, CFD Engineer

About the Author: While I grew up in a turbomachinery lab characterizing heat transfer, fluid mechanics, & turbulence in gas turbine secondary flow systems in graduate school, I fell in love with artificial intelligence in 2017 working on a project that combined computational fluid dynamics simulations & machine learning during an internship with the Siemens Healthineers in Princeton NJ. Ever since, I have sought to maintain my career direction (mechanical and aerospace engineering applications) but incorporate machine learning and data science as a means to augment our numerical methods in engineering.



RBF Morph – We published this study in 2020 when the MeDiTATe-project just began! We have today 14 young researchers highly skilled on Medical Digital Twins, 2 Experiments of the FF4EUROHPC project completed and the LivGemini Start Up active. As part of Avicenna Alliance we are committed to move forward by supporting the digital transition of the healthcare for better treatment and better prevention.



Enginsoft - Web – Excerpts - [Tools and methodologies for generating digital twins in medical research](#)

An overview of the latest advances of the use of CAE technologies in the medical field

Marco Evangelos Biancolini, Ubaldo Cella
Università di Roma Tor Vergata
Corrado Groth, Stefano Porziani
RBF Morph

Abstract - The pervasive use of engineering simulation during the design phase and for virtual testing, thus eliminating the need for multiple prototypes prior to product launch, is well established today.

The continuously growing availability of computing power and simultaneous algorithmic improvements now make high-fidelity numerical resolution of complex problems possible, integrating methodologies that are becoming established procedures in many fields of engineering. Clinical research has benefitted from these advances. Furthermore, the advent of technologies such as big data management, augmented reality, automated computer-aided engineering (CAE) processing in high performance computing (HPC) environments, and additive manufacturing are changing the way healthcare is delivered with implications for the skills required by the next generation of healthcare professionals and academic researchers. The use of numerical simulation to address clinical problems has been consolidated in Europe through several research activities that also involved non-medical institutions specialized in engineering technologies.

This article provides a non-exhaustive overview of some of the latest advances in the adoption of CAE technologies in the medical field by citing some ongoing EU research programs.

The need for numerical simulations capable of accurately predicting the behavior of a device or prosthesis is constantly increasing [1] [2]. Furthermore, in the era of in-silico medicine, the combination of computer simulations with big data is mandatory. Engineering simulations generate tremendous amounts of data to be processed and that must be rapidly integrated and correlated with patient data. Such data-intensive research can be adequately supported by creating dedicated cyber-infrastructure that integrate data, tools, and research protocols in a unified and easily accessible environment: this is the Digital Twin concept. Healthcare is rapidly embracing this technology. The goal of this trend is to provide personalized data-driven medicine.

Digital twins are built on computer-based, or in-silico, models powered by individual and population data. They have been applied to complex systems in different fields of engineering. As a virtual representation of a physical object or system across its life cycle, digital twins aim to model systems computationally to develop and test them more quickly and economically than is possible in a real-life context. Ideally, in medicine, the

concept of the digital twin can be translated to patients to improve diagnostics or treatment, and to accelerate medical innovation and regulatory approval using an ideal replica of a human body showing the physiological and pathological results in the present and future. From this perspective, digital twins provide a safe environment to test the impact of changes on the performance of a healthcare system, improving the selection of optimal solutions and reducing the risk of harm to patients.

Despite the efforts in research, the extensive use of scientific computing tools in medical practice is still in its infancy. Bringing innovation to the healthcare sector is a long and costly process that requires clinical evaluation and regulatory approval. The validation of numerical simulations through clinical studies therefore remains challenging and scarce, or limited to small cohorts. The European Union is improving innovation by funding several programs focused on the role of digital twins in medical research. The heterogeneous know-how involved in the development of such technologies promotes the generation of a new class of consortia in which several highly specialized non-medical competences work side by side in a novel and extraordinarily stimulating environment. In this scenario, the “Tor Vergata” University of Rome is playing an important role by sharing engineering technologies, joining research partnerships and leading international networking training programs. Here is an overview of some of the EU research on this topic and relevant examples of where different CAE numerical technologies have been adopted to generate digital twins able to model the physics involved in clinical problems.

...

RBF - mesh morphing - Mesh morphing consists of adapting a computational grid commonly used for CAE. The solid or shell mesh of a structural part ready to be processed by a finite element analysis (FEA) solver, or a volume mesh complete with boundary conditions for a CFD solver, can be adapted to a new shape by simply updating the nodal positions. This means that the topology of the mesh (node count, cell count, connectivity) remains unchanged. Only the x,y,z coordinates of the nodes in the part of the model whose shape is being modified are updated. Mesh morphing can be used for different purposes: to create shape parameters (i.e. to modify a length, an angle or a thickness), to switch to a new known shape (i.e. to obtain the geometry as manufactured, or designed by CAD), to switch to a shape provided by the CAE solution (automatic shape optimization with adjoint or biological growth method (BGM)), and/or to support Multiphysics (to move the CFD mesh according to the evolution of the one connected to the FEM, enabling erosion/deposition).

Usually mesh morphing is faster than remeshing for a number of reasons: it avoids the “remeshing noise” (having the same mesh adjusted means that the effect of a parameter is not confused with the effect of a new mesh structure), so the variation effects can be evaluated even with a coarser mesh; the CAE model can be updated in the background keeping all the original settings (boundary conditions); and updating the nodal positions usually requires less computational effort than a complete mesh regeneration. Creating shape parameters with mesh morphing is generally faster than creating a parametric CAD model. One of the most efficient mathematical frameworks to address the problem of mesh morphing is recognized as radial basis functions (RBF) [4]. RBFs are mathematical tools capable of interpolating known fields on a cloud of points. Mesh morphing defines a displacement field on a cloud of source points (usually some of the surfaces/curves of the CAE mesh) and then propagates it over a cloud of target points (usually the volume/surface mesh nodes of the CAE model being adapted). The method is well-suited to the needs of mesh morphing: its meshless nature allows you to easily manage partitioned meshes used for HPC parallel computing while its node-based nature allows you to have full control of specific areas. The computing cost of RBF can be very high, so specific algorithms (fast radial basis functions) are necessary to reap these benefit for industrial applications.



BMW – Web- [Limestone replaces water to save resources in BMW paint shops.](#)

The BMW Group is working flat out to develop sustainable solutions for production and remain relevant in the future: at BMW Group Plants Dingolfing and Regensburg, in Bavaria, the paint shops will soon work entirely with dry separation by limestone powder.

All four paint lines at Dingolfing have already been converted, and the first of the two in Regensburg started dry separation in early 2024. The second Regensburg line is set to follow in August 2025. At Dingolfing and Regensburg, dry separation already saves 17 million litres of water and some 17,400 megawatt-hours of energy a year – cutting CO2 emissions by more than 5,000 tonnes in the process.

BMW Group Plants Dingolfing and Regensburg, then, are setting new standards in resource conservation and environmental protection. The paint shop in Dingolfing was the first in the company's global production network to switch completely to dry separation with limestone powder, upgrading all four paint lines during ongoing operations in the space of two years. The same is now happening at Plant Regensburg, where one of the two basic paint lines was converted by the middle of January this year and the second will follow in August 2025.

Given that painting is the most energy-intensive process in vehicle production, the impact of these measures on the carbon footprint of the two plants is significant. Anton Kronseder, head of the paint shop in Dingolfing: "Switching to dry separation takes us one step closer to achieving the BMW Group's goal of cutting CO2 emissions across the vehicle lifecycle by 40 percent by 2030."

To put that into numbers: with the new process in place, the two plants are already saving a total of 17 million litres of water annually – enough to supply almost 100 families of four for an entire year. Also, because it works with recirculated air, dry separation saves 17,400 megawatt-hours of heating energy a year and more than 5,000 tonnes of CO2 emissions as a result. In addition, the limestone that's used as a binder is recycled as feedstock for the construction materials industry.

Although Dingolfing was the first paint shop to be converted, the new technology was actually first used at BMW Group Plant Regensburg, where clear-coat application on the two lines was converted back in 2010. "Back then, dry separation with limestone powder was a first not just at the BMW Group but in the entire automotive industry," explained Dr Jürgen Stiegler, head of the paint shop in Regensburg.

Recycling overspray by the new method. With the new system in place, overspray can now be recycled. On the converted paint lines at the east Bavarian sites, it is collected by dry separation, with limestone as a binding agent.



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



By using powder rather than water to collect paint particles that do not make it onto the car body, the paint shops are saving significant amounts of the resource: around 4 million litres of water a year in Dingolfing and 13 million in Regensburg. Unlike the wet-scrubbing method used previously, dry separation works with 80 percent recirculated air. So now, just 20 percent of the air required for painting needs to be tempered and humidified.

This saves vast amounts of energy: in Dingolfing, heating energy is down by 13,000 megawatt hours a year, cutting CO2 emissions by more than 4,000 tonnes. Regensburg is saving some 4,400 megawatt-hours of natural gas a year and avoiding some 1,150 tonnes of CO2.

Another advantage of the new painting system is that, unlike contaminated water, limestone powder does not need to be treated and disposed of. Instead, it can be returned to the material cycle.



Limestone powder from the foot of the Walhalla – from binding to building material. - The limestone powder that's used is regionally sourced Walhalla stone quarried on the Keilberg near Regensburg. On average three truckloads of the fresh mineral a week are delivered to Dingolfing and between one and two to Regensburg. There, it is transferred into large silos for storage and then fed dust-free into the painting booths.

Binding excess paint for a single car takes about 20 kilogrammes of limestone powder. The limestone is then sent to be recycled for further use, as feedstock in the cement industry, for instance. So, as well as painting about 2,850 bodies-in-white per day, the paint shops contribute to the production of construction materials.

The introduction of dry separation takes the BMW Group one step further on the road to sustainable production of the future.



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

Excerpt - The incredible engineering and technology underpinning the performance, style and functional design the McLaren P1™, made it the perfect challenge for the LEGO Technic team to replicate in 1:8 scale.



McLaren – Web - [An icon reimaged: McLaren and LEGO Group unveil the LEGO® Technic™ McLaren P1™](#)

The British supercar maker McLaren Automotive and the LEGO Group today unveil their latest collaboration paying tribute to the world's most pioneering hybrid hypercar, with the introduction of the LEGO® Technic™ McLaren P1™.

The McLaren P1™ redefined automotive high-performance as the most exciting, most capable, most technologically advanced and most dynamically accomplished supercar of its time. The P1™ leveraged McLaren's advanced motorsport-based engineering, featuring ground-breaking advances in weight reduction, packaging, high-speed performance, powertrain and aerodynamics.

Created with the intention of being 'the best driver's car in the world on both road and track', the design and technical specifications of the McLaren P1™ provided the ideal foundation to deliver on this ambition. The remarkable hypercar is recognized as a landmark both for McLaren and the development of high-performance hybrid vehicles. Unveiled as part of the LEGO Technic Ultimate Car Concept

Series, the all-new 1:8 scale LEGO Technic version consists of 3,893 elements and each car features a unique serial number which unlocks special behind-the-scenes content. The model has a 7-speed gearbox with 2 shifter drums, suspension, V8 piston engine, adjustable rear wing, and opening dihedral doors with advanced mechanism – all guaranteeing an immersive building experience from start to finish that is authentic to the real McLaren P1™. The model was created by the LEGO Technic design team in close collaboration with McLaren Automotive and both teams were focused on implementing as much cutting-edge functionality in the model as possible, as a tribute to both the real P1™ as well as the engineering excellence that McLaren is known for.

"It's amazing to see so many of the elements from the original P1 brought to life by the LEGO team for the LEGO Technic McLaren P1™. I hope this collaboration inspires the next generation of designers and engineers to push the boundaries of automotive innovation." Tobias Sühlmann Chief Design Officer, McLaren Automotive



"From the exterior with aerodynamic shapes to the interior & V8 piston engine - the real McLaren P1™ is an incredible car. We wanted to capture these details in the best way possible with our LEGO Technic model & we did not want to compromise in any way "Therefore, we worked on multiple variations of the car to test different designs. We also faced a huge challenge with the iconic butterfly doors because they needed a new mechanism to stay open. It was a great experience to recreate the McLaren P1™ and I'm hoping all supercar enthusiasts out there are ready

to explore the details & intricacies of the real LEGO McLaren P1™ in Technic form." Kasper Rene Hansen, Designer, LEGO Group



US Air Force Picture of the Month



Viper climb - Capt. Taylor Hiester, F-16 Viper Demonstration Team commander and pilot, performs an aerial maneuver during the Dayton Air Show at Dayton International Airport, Ohio, June 22, 2024. This year marked the 50th anniversary of the F-16s and the air show.

(U.S. Air Force photo by Daniel Peterson)



Pacific Skies - An F-22 Raptor assigned to the 3rd Wing takes off during German air force-led deployment, Pacific Skies 24, at Joint Base Elmendorf-Richardson, Alaska, July 2, 2024. The F-22 is designed to project air dominance and cannot be matched by any known or projected fighter aircraft, providing power projection across the Indo-Pacific region.

(U.S. Air Force photo by Senior Airman Shelimar Rivera Rosado)



Bank on it - An F-35A Lightning II assigned to the F-35A Lightning II Demonstration Team performs a practice aerial demonstration prior to the Warriors Over the Wasatch Air Show at Hill Air Force Base, Utah, on June 28, 2024. The demo team performs flights regularly to maintain flying certifications and to uphold and maintain their mission and Air Force recruiting standards.

(U.S. Air Force photo by 1st Lt. Nathan Poblete)



EXCERPTS European Defence Agency - Web - [First MRTT aircraft delivered to Eindhoven](#)

Preparations for the Multinational Multirole Tanker & Transport Fleet (MMF), aimed to increase Air-to-Air Refueling capabilities in Europe, reached a significant milestone today when the first Multi-Role Tanker Transport (MRTT) aircraft was delivered to the fleet's main operating base in Eindhoven.

In total, the fleet could count up to 11 Airbus A330 MRTT aircraft of which eight have already been procured. While the first of them (MMF1) has now been delivered, the consecutive aircraft (2 to 8) will be delivered in the coming years: a brand new MRTT will be delivered roughly every six months...

Six participating countries so far - The MMF, managed by the NATO Support & Procurement Agency (NSPA) with strong support of the Organization for Joint Armament Cooperation (OCCAR) under the ownership of NATO & operated by an international unit, will provide its six participating Member States (Belgium, Czech Republic, Germany, Luxembourg, Norway & the Netherlands) with strategic tanker & transport capabilities. **Based on a pooling & sharing concept, the participating countries will have access to a total of 8 (& in the future perhaps to 11) Airbus A-330 MRTT aircraft which can provide strategic transport (pax & cargo), air-to-air refueling & medical evacuation capabilities.**

Example of excellent EU/NATO cooperation - The multinational fleet builds on the excellent cooperation between NATO & EU Member States & Agencies since the very beginning of the project.

Back in 2011, the European Defence Agency started an initiative to address the long-standing European shortfall in the air-to-air refueling capacity. Since then, this initiative has grown into a mature program handed over to & managed by the NSPA on behalf of the participating countries & supported by OCCAR for the acquisition phase. **The MMF program stands as an example on how European countries can cooperate, pooling & sharing resources to get access to state of the art capabilities that would be difficult or impossible to access individually.** All the countries involved, independently of their size & the number of flying hours, have access to the MMF capabilities. EDA's Chief Executive Jiří Šedivý said: "The Multinational Multirole Tanker & Transport Fleet is a prime example of European defence cooperation done in close coordination with NATO, which shows that once a capability shortfall has been jointly identified, European nations can pull together, work on a common project aimed at filling the gap, & eventually deliver – as they do with today's delivery of the first aircraft. It's Pooling & Sharing at its best. The European Defence Agency stands ready to assist additional Member States which are in need of AAR capabilities to explore their potential participation in this important project". NATO Assistant Secretary General for Defence Investment, Camille Grand, said: "The MRTT fleet's versatility in providing several critical capabilities simultaneously is nothing short of impressive. The aircraft can help respond to ... emergency, by moving medical supplies & conducting medical evacuations. ...the MRTT fleet will help contribute to a fairer transatlantic burden-sharing at NATO. It is also a successful pilot multilateral cooperation project, bringing together a number of Allies & multiple NATO & EU institutions & agencies in support of the delivery of a major capability".

Background - The Netherlands & Luxembourg initially launched the program in July 2016, with the first one as the lead nation of the project. Germany & Norway joined in 2017, Belgium followed in early 2018 & Czech Republic lastly joined the MMF program in October 2019. The MMF aircraft will be operated by the Multinational Multirole Tanker Transport Unit (MMU) comprising of military personnel of the participating countries. The unit is based in two permanent operating bases, the Main Operating Base in Eindhoven & the Forward Operating Base in Cologne-Wahn. Among the eight MMF aircraft, five will be based in Eindhoven, & three in Cologne.



BAYKAR - Web - [The indigenous Bayraktar TB3 UCAV successfully completes a high-altitude system identification and performance test in Keşan, reaches an altitude of 36,310 ft with its indigenous engine.](#)

EDİRNE / KEŞAN

The Bayraktar TB3 armed unmanned aerial vehicle (UCAV), Baykar's indigenous and original aircraft, continues to undergo tests with resounding success. Marking the Republic's centennial by completing its maiden flight on October 27, 2023, the indigenous drone has been passing system identification and performance tests at various altitudes. Most recently, it reached the highest altitude to date.

Above and Beyond with an Indigenous Engine - During a test flight at the Baykar Flight Training and Test Center in Keşan, Edirne, the Bayraktar TB3 UCAV passed its high-altitude system test with flying colors, climbing to an altitude of 36,310 ft. Powered by TEI's indigenous PD-170 engine, the Turkish drone thus cleared yet another critical milestone.

The Bayraktar AKINCI, another indigenous and original aircraft developed by Baykar, holds Türkiye's altitude record with 45,118 ft.

Ski-Jump from Ramp Akin to TCG Anadolu Runway -After passing various tests in Çorlu, Tekirdağ, the Bayraktar TB3 UCAV was recently relocated to before being relocated to the Baykar Flight Training and Test Center in Keşan, Edirne. On June 1, 2024, it completed a ski-jump for the first time. The facility in Keşan is equipped with a 12-degree ramp on a runway identical to the TCG Anadolu's main deck, where the aircraft will be stationed. Seamlessly passing tests, the Bayraktar TB3 is inching closer to operational deployment on the aircraft carrier by undergoing ski-jump tests.

Total Flight Time: 445 Hours - To date, the Bayraktar TB3 has flown for 445 hours and three minutes during a series of test flights. During an endurance test on December 20, 2023, the indigenous drone remained airborne for 32 consecutive hours, covering a distance of 5,700 kilometers.

Indigenous UCAV, Indigenous Camera - On March 26, 2024, the Bayraktar TB3 UCAV was equipped with the ASELFLIR-500 Electro-Optical Reconnaissance, Surveillance and Targeting System, an indigenous product of Aselsan. Over the course of relevant tests, the ASELFLIR-500, which outperforms its global rivals, was successfully integrated into the aircraft.

First Flight Off TCG Anadolu due in 2024 - With its foldable wings, the Bayraktar TB3 will be the world's first armed unmanned aerial vehicle capable of taking off and landing on short-runway vessels like TCG Anadolu. Baykar Chairman and Chief Technology Officer Selçuk Bayraktar previously announced that the company plans to start testing the Bayraktar TB3 aboard the Turkish aircraft carrier within this year.

The Bayraktar TB3's capabilities will represent a major innovation for unmanned aerial vehicles within its class. Thanks to Beyond Line of Sight (BLOS) communication, it will be possible to operate the indigenous aircraft from vast distances. In this sense, it will serve as a force multiplier for Türkiye's deterrence by conducting reconnaissance-surveillance, intelligence, and overseas combat missions with its smart munitions. **Article continues on the website.**



- **Excerpts - For FEA, the four 3D models of bone combined with the implant as well as the sole model of the bone were imported into the numerical simulation software Ansys** (Version 2021 R2, ANSYS., USA).
- The 3D models of the cortical & cancellous bone were imported into the CAD (computer-aided design) software SolidWorks (Version 2022, Daussault,FR)



BMC Veterinary Research – Web- [Numerical evaluation of internal femur osteosynthesis based on a biomechanical model of the loading in the proximal equine hindlimb](#)

Jan J. Lang, Xinhao Li, Carina M. Micheler, Nikolas J. Wilhelm, Fritz Seidl, Benedikt J. Schwaiger, Dirk Barnewitz, Ruediger von Eisenhart-Rothe, Christian U. Grosse & Rainer Burgkart

- Dept. Orthopedics & Sports Orthopedics, TUM School of Med., Tech. Univ. of Munich, Germany
- Dept Diagnostic & Interventional Neuroradiology, TUM School of Med., Tech. Univ. of Munich, Germany
- Equine Clinic of the Res. Ctr. for Medical Tech. & Biotechnology, Bad Langensalza, Germany
- Chair of Non-destructive Testing, TUM School of Engineering and Design, Tech. Univ. of Munich, Munich, Germany

Femoral fractures are often considered lethal for adult horses because femur osteosynthesis is still a surgical challenge. For equine femur osteosynthesis, primary stability is essential, but the detailed physiological forces occurring in the hindlimb are largely unknown. The objective of this study was to create a numerical testing environment to evaluate equine femur osteosynthesis based on physiological conditions.

The study was designed as a finite element analysis (FEA) of the femur using a musculoskeletal model of the loading situation in stance. Relevant forces were determined in the musculoskeletal model via optimization. The treatment of four different fracture types with an intramedullary nail was investigated in FEA with loading conditions derived from the model.

The analyzed diaphyseal fracture types were a transverse (TR) fracture, two oblique fractures in different orientations (OB-ML: medial-lateral and OB-AP: anterior-posterior) and a "gap" fracture (GAP) without contact between the fragments. For the native femur, the most relevant areas of increased stress were located distally to the femoral head and proximally to the caudal side of the condyles. For all fracture types, the highest stresses in the implant material were present in the fracture-adjacent screws. Maximum compressive (-348 MPa) and tensile stress (197 MPa) were found for the GAP fracture, but material strength was not exceeded.

The mathematical model was able to predict a load distribution in the femur of the standing horse and was used to assess the performance of internal fixation devices via FEA. The analyzed intramedullary nail and screws showed sufficient stability for all fracture types



Excerpt - Thermal and structural analyses were conducted using Abaqus/CAE 2021 [9]. After examining different modeling techniques, an axisymmetric finite element (FE) model provided good accuracy with reduced computational effort compared to 3D modeling. The model adopted a 4-node deformable CAX4R element [9] for thermal and structural analysis stages. The transient thermal analysis problem was solved using the Abaqus transient heat transfer module



MDPI – Website - [Fire Endurance of Spherical Concrete Domes Exposed to Standard Fire](#)

A. Kassem, A. El Ansary, M Youssef

Civil Engin. Dept., Beni-Suef Univ., Egypt

Dept. Civil and Envir. Engin., Western Univ., Canada

Abstract - Fire is considered a common hazard for civil structures.

Public and administrative buildings are commonly designed by considering the standard fire rating and, in many cases, contain large compartments with central domes, in which fire growth can be significant. Moreover, tanks and underground fortified structures may be constructed as domes to support the heavy soil above. This paper numerically addressed such a case. First, an axisymmetric finite element model was developed and validated to predict the dome's transient, thermal, structural, and thermal-structural behavior. Next, the model was used to conduct a parametric study to investigate the effects of the dome ring reinforcement, thickness, stiffness, central angle, base restraints, load type (external pressure or gravitational), and load ratio on the fire endurance of the dome. Design recommendations to increase the fire endurance of concrete domes were formulated based on the parametric study.

Introduction - Figure 1 presents examples of spherical concrete domes. Their aesthetics and large spans make them attractive structural systems for many applications. The photos show the typical geometrical forms: a spherical cap (partial dome) and a semi-sphere (full dome).

Failure of a concrete dome could happen in either the ring or the meridian direction. Failure in the ring direction transforms the dome into several arches balanced at the apex. In contrast, failure in the meridian direction results in instability, leading to a total collapse. Spherical concrete domes are typically reinforced in the ring direction to prevent hoop brittle tensile failure. In contrast, the meridian direction is usually unreinforced or has minimum reinforcement.



(a) Partial dome



(b) Full dome



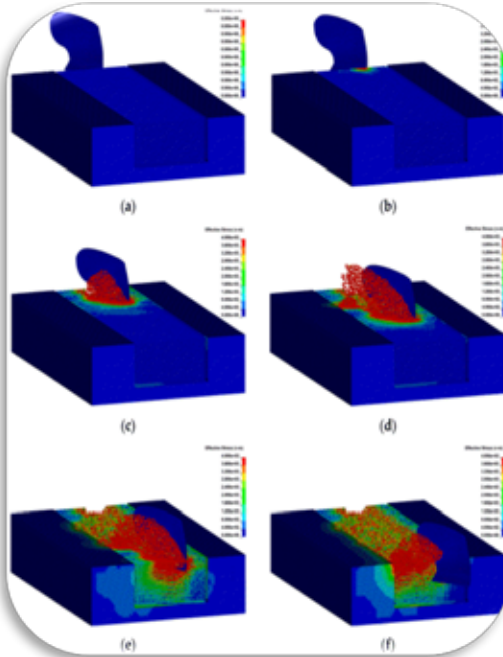
The Old Cattle Rancher's Ranch

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

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

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

August



Simulation of Mouldboard Plough Soil Cutting Based on Smooth Particle Hydrodynamics Method and FEM–SPH Coupling Method - X. Jim, F.Ma, D.Want, Z.Zhu

Dept.of Mechanical Engin., Xinjiang Univ. China

- Few people have yet to apply the SPH method to simulate mouldboard plough–soil interactions. Thus, the following are the aims and objectives of the current work: (1) The mouldboard plough–soil interaction is simulated using the SPH method utilizing the finite element software LS-DYNA
- ...the finite element software LS-DYNA was used to build the SPH model & the FEM-SPH coupling model of soil cutting, as well as to investigate the change in cutting resistance during the soil cutting process...The methods in LS-DYNA that can be used to treat sliding and impact along the interface include the kinematic constraint method, the penalty method, the distributed parameter method, and others.

Abstract - In the field of agricultural machinery, various empirical field tests are performed to measure the tillage force for precision tillage. However, the field test performance is costly and time-consuming, and there are many constraints on weather and field soil conditions; the utilization of simulation studies is required to overcome these shortcomings. **As a result, the SPH method and the coupled FEM-SPH method are used in this paper to investigate the mouldboard plough–soil interaction. In this paper, the finite element software LS-DYNA was used to build the SPH model and the FEM-SPH coupling model of soil cutting, as well as to investigate the change in cutting resistance during the soil cutting process.**

The simulation results are compared with those of the experiments, and the curves of the simulation and experiment are in good agreement, which verifies the reliability of the model. The validated simulation model was used to investigate the effects of the cutting speed, depth of cut, inclination angle, and lifting angle of the mouldboard plough on cutting resistance. The simulation studies show that the SPH model takes 5 h and 2 min to compute, while the FEM-SPH coupled model takes 38 min; obviously, the computational efficiency of the FEM-SPH coupled model is higher. The relative errors between the SPH model and the experiment are 2.17% and 3.65%, respectively. The relative errors between the FEM-SPH coupled model and the experiment are 5.96% and 10.67%, respectively. Obviously, the SPH model has a higher computational accuracy. The average cutting resistances predicted by the SPH model and the FEM-SPH coupled model, respectively, were 349.48 N and 306.25 N; these resistances are useful for precision tillage. The cutting resistance increases with the increase in cutting speed and is quadratic; the cutting resistance increases with the increase in cutting depth and is quadratic; the horizontal cutting resistance and the combined cutting resistance increase with the increase in inclination angle, while the vertical cutting resistance remains essentially constant with the increase in inclination angle; the horizontal cutting resistance and combined cutting resistance increase as the lifting angle increases, while the vertical cutting resistance decreases as the lifting angle increases.



Thank you for joining me on my monthly visit to a museum or landmark..

Website, “An exemplar of the enterprising nature underpinning the inimitable spirit of the city and of the visionary Founder of the Tata group, Jamsetji Tata, The Taj, as it is popularly known, was a tribute to his beloved city.”



Tata Heritage News – Web - [The Taj Mahal Palace, Mumbai](#) - To Bombay, With Love - Standing resplendent over the harbour for 120 years.

The Taj Mahal Palace, Mumbai — India's first luxury hotel — is **Jamsetji Tata's grandest gift to the city that captured his imagination**

For more than 120 years, The Taj Mahal Palace, Mumbai has stood steadfast and proud, a beacon

adorning the city's centuries-old harbour, older than the Gateway of India, its own history unfolding in concert with a city that has blossomed into the bustling metropolis that Mumbai is today.

The ‘diamond by the sea’ has remained an enduring symbol of the city — in the words of Charles Allen and Sharada Dwivedi in *The Taj at Apollo Bunder*, “But the Taj is more than a hotel and a landmark. If that other Taj Mahal ... can be said to represent the glories of the Mughals, so Mumbai's Taj stands for just those qualities that have made this city remarkable. In its founder, its ethics, its pioneering of new ideas, its role as a trysting-place for lovers and film-stars, maharajas and nawabs, businessmen and politicians alike, in its very location as a landmark and as a witness to momentous events, the Taj epitomises the spirit of the Bombay of yesterday and Mumbai today.”

The first sight for ships calling at Bombay Port, The Taj Mahal Palace, Mumbai, with its 240-feet high red Florentine dome — a striking part of Mumbai's skyline — is the first luxury hotel of its kind in India, standing tall, a silent, steady witness to the march of history.

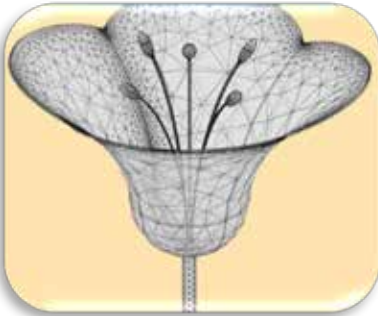


The finest of them all - Travelling extensively abroad, it became apparent to Jamsetji that Bombay fell woefully short in offering its guests world-class hospitality. Undeterred by the financial risk, Jamsetji acquired two-and-a-quarter acres of land by the Arabian Sea and began his ambitious plan to build for India a hotel that was “second to none, East of the Suez”.

From paying a princely sum to the hotel's principal architect and builder to scouring New York, London, Paris, Düsseldorf and Berlin, and securing the most modern equipment, such as an electric plant to power the lights and lifts and a backup system for power failures, Jamsetji left no stone unturned, steadily breathing life into his audacious dream. In 1902, the Indian Hotels Company Ltd (IHCL) — the parent organisation of The Taj Mahal Palace, Mumbai — was incorporated. On December 16, 1903, as the first guests stepped inside the hotel, that distinct quality of Tajness was born — quintessential Indian hospitality, unparalleled luxury and world-class service.



From the website, "While bumblebees are not a complete mystery, we still have a lot more to learn about these helpful insects. A topic with a lot of buzz surrounding it is how they find food. Using electroreception, an ability most often found in aquatic animals, is one possibility. But how do bumblebees use electroreception? To find answers, a research team at the University of Bristol combined the power of physical experiments and simulation."

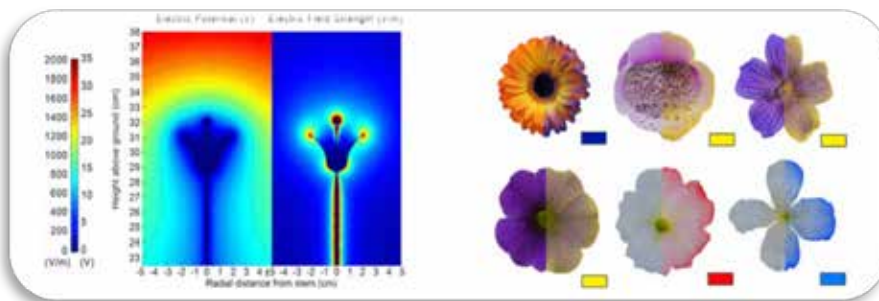


Comsol Website Excerpts - [Do Bumblebees Use Their Hairs or Antennae for Electroreception?](#) by Caty Fairclough

What We Know About Bumblebees - When I think of bumblebees, my mind goes to warm summer days and tiny creatures lazily flying around the flowers in my mother's garden. They appear to move in a seemingly random pattern, picking up pollen as they fly from one flower to the next. This is, of course, just the behavior that I can see...

Unseen electrical charges play a large role in how bumblebees interact with their environment. We've known for some time that bees become positively charged by flapping their wings. This charge helps pollen stick to a bumblebee's hair when it lands on flowers, which feature a negative charge.

Research previously highlighted on the blog expanded upon such knowledge by suggesting that the electric potential of a flower changes when a bumblebee lands on it. This acts as a signal to other bumblebees, guiding their pollination activities.



Left: Simulating the electric field potential and electric field strength of a flower. Right: Physical experiment involving spraying flowers with an electrostatic-colored powder (illustrated on the right-hand side of the flower). The variation of electric field strength on the surface of the flowers is represented by the density of the powder.

Copyright © Clarke, Whitney, Sutton, and Robert, from their paper, "Detection and Learning of Floral Electric Fields by Bumblebees".

Since that time, the research team from the University of Bristol has remained as busy as the bees that they study. Most recently, they have focused on analyzing bumblebee electroreception, which is the ability to detect natural electrical stimuli in the air in order to gather information about the surrounding electric fields and make foraging decisions.

Although electroreception is a known feature for aquatic animals such as sharks, rays, and dolphins, it is not typically characteristic of terrestrial animals. And when electroreception is found in terrestrial animals, such as platypuses, it only functions when submerged in water or surrounded by damp or humid substrates.



Bees, however, must be able to detect electric fields in the air, which is an electrically insulating medium. With this ability, bumblebees can detect the static electric fields of flowers, and honeybees can note the oscillating fields associated with their waggle dance.



Bumblebees can sense the electrical potential of flowers with electroreception. Left: Flower simulation utilized in bee electroreception research. Copyright © Dominic Clarke. Right: Photo of a flower.

The researchers investigated the idea that electric fields exert forces on bumblebees' mechanosensory structures, producing a mechanical response that enables these insects

to detect electric fields. Let's take a look at their work, which involves a combination of physical experiments and simulation research.

Investigating Bumblebee Electroreception - Since electroreception is a recently discovered insect sensory ability, the mechanisms behind it are not yet fully understood. To get a closer look at the electromechanical coupling that drives bumblebee sensory mechanisms, researchers from the University of Bristol chose to study two putative electric field sensors: antennae and mechanosensory hairs. For their experiments, they tested two hypotheses:

- Bumblebees detect electric fields with their antennae.
- Bumblebees detect electric fields with their mechanosensory hairs.

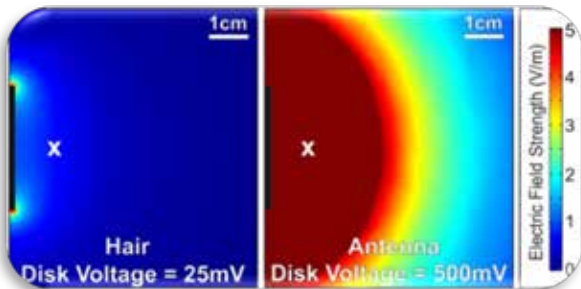
Let's begin by reviewing the results of the physical experiments. By examining the mechanical and neutral responses of the antennae and mechanosensory hairs, the researchers observed that the electric fields cause deflections in both of these sensors. While both the hairs and antennae move in response to the electric fields, the hairs feature a greater median displacement, angular displacement, and velocity.

When further evaluating the sensitivity of the electromechanical response, the researchers observed that the vibrational velocity of the hairs is an order of magnitude greater when compared to the antennae. They also found that the voltage at which the measured vibrational velocity can be distinguished from thermal noise, U_{min} , is lower for hairs, indicating that they have a higher sensitivity to electrical fields.

These findings led to a conclusion: Bumblebee mechanosensory hairs are more effective sensors than bumblebee antennae.

Further Comparing Hairs and Antennae in Bumblebee Electroreception with Simulation - **After conducting these experiments, the researchers moved onto performing simulation studies. The team used the COMSOL Multiphysics® software to perform a finite element analysis.** Their goal was to determine the required electrical charge for producing a response in the bumblebee, as well as the maximum distance that can exist between a bumblebee and a flower for electroreception to still work.

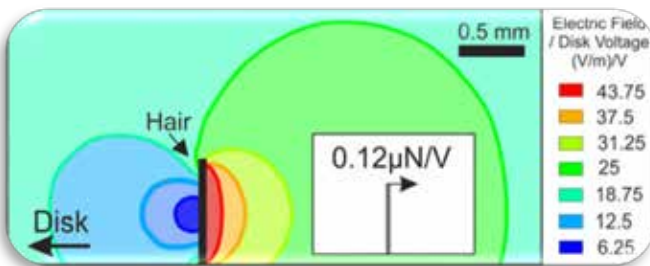
The researchers began by creating a model of bumblebee hair exposed to the electric field of a steel disk at various voltages. They then used this model to compare the amount of voltage needed to generate mechanical motion in the hair and antennae, placing the sensor 1 cm away from the disk. The results indicated that the charged mechanosensory hairs, as compared to the antennae, require a much lower minimum electric field strength to produce mechanical motion.



Simulation results of the electric field showing the minimum voltage that causes observable motion in the hair (25 mV) and antenna (500 mV). Here, the white 'X' represents the locations of the hairs and antennae.

Copyright © Sutton, Clarke, Morley, and Robert.

In regards to the sensitivity of the hair and antennae to an electric field, the researchers calculated the maximum distance at which these structures are actuated by a disk at 30 V, a similar electric field to that of flowers. They found that depending on the stimulus frequency, charged hairs can be actuated at a distance of 7.1 cm to 55 cm, while antennae can be actuated at a maximum distance of 2.6 cm to 13 cm. Once again, the results indicated that the hairs are more sensitive.



Simulation showing bumblebee hair exposed to an electric field that is 1 cm away. Here, we can observe the projected force on the hair, with the electric fields given per positive volt on the disk.

Copyright © Sutton, Clarke, Morley, and Robert.

The final point of analysis was to determine if mechanical movement generates a response in the bumblebee's nervous system. In these studies, the bumblebee hairs showed an increase in neural firing rate when a DC electric field was applied. Comparatively, stimulation did not increase the firing frequency in the antennae. However, in control recordings, the antennae did respond to olfactory (lavender oil) and mechanical (air puff) stimuli.

From their results, the researchers were able to conclude that while electric fields can cause motion in both the antennae and mechanosensory hairs, only the hair motion produces a neural response. As such, bumblebees use their hairs to detect electric fields and these sensory hairs are thus a site of electroreception. And although previous studies have proposed that the honeybee antennae can detect electric fields, the experiments presented here fail to indicate that bumblebee antennae effectively respond to electric fields.

Along with providing a deeper insight into the behavior of bees, this research gives way to the possibility that other terrestrial animals may be able to detect and react to electric fields using sensory hairs. With continued studies, we can gain a closer look at the dynamic behavior of other animals in nature, going beyond just what meets the eye.



Rheannon's Aerospace News The Dragon Hangar

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

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



August

EDWARDS AIR FORCE BASE, Calif. - Web - [Edwards students prove that rocket science is not complicated](#)

By Laisa Leao - 412th Test Wing

PHOTOS BY: Nicolas Cholula, Laisa Leao



Students at Irving Branch Elementary School on Edwards AFB built, painted and launched 12 rockets as part of a practical science, technology, engineering and mathematics project. This hands-on experience allows the student to extend what they have learned in the classroom to the real world.

First, they learned about the role of each part and how the components work together. The students followed precise instructions, paying attention to detail to build functional rockets. Mistakes were part of the plan and provided opportunities to solve problems and control quality of the final product.

“Students demonstrated persistence and determination as they had to do and re-do the same step of the instructions few times until they got it right,” said Nick Cantrell, Teacher at Branch Elementary School.

Next, students painted and named the rockets. The inclusion of art in this STEM endeavor gave students a sense of pride and ownership. It fostered creativity, self-expression, communication and compromise, as students worked in teams that not necessarily had the same ideas and preferences.

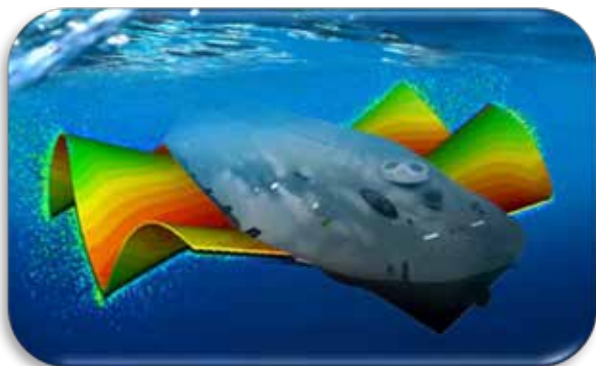
Finally, students watched their rockets launch from a safe distance. As their rockets soared into the sky and came back to the ground through the smoke they produced, the time, work and efforts put into this project made sense. The atmosphere was fulfilled with excitement and joy.

The rockets performed differently, inciting the students to think critically and explain why. Each rocket's round trip only took few minutes, but it had a lasting impact on the students.

“The students developed a growth mindset that they will carry with them throughout their lives,” said Cantrell.



Movie Feature – Biomimicry - the practice of creating designs based on structures and sequences from the Earth's natural world, including its plants, animals and geographies.



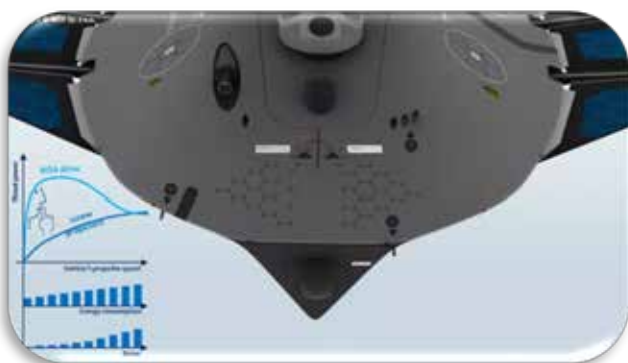
NOA MARINE has designed a method of UUV locomotion, for commercial class vessels, that mimics the fins of a squid. **ANSYS – Web - [Engineers Use Biomimicry to Innovate the Propulsion of Unmanned Underwater Vehicles](#)** - Author - Shawn Wasserman

Unmanned underwater vehicle (UUV) designs haven't changed much for the past few decades. Many UUVs still use traditional rotary screw propellers and torpedo-like hulls.

Though dependable, this setup offers poor agility and payload capacity — making underwater operations, inspections, research and aquaculture costly and inefficient. Additionally, the noises these UUVs make can disturb the wildlife they are designed to observe.

To keep costs down, the marine industry needs UUVs that can carry heavier payloads and travel longer distances. They will need to be sturdy, maneuverable, fast and rechargeable so they can handle long multiday missions without hitting obstacles — like fishing nets. Finally, these UUVs need to be silent.

To reach those goals, NOA MARINE, an Ansys Startup Program member, performed biomimicry research to design a wave drive propulsion system that mimicked the propulsion of squid. Using Ansys Mechanical and Ansys Fluent, NOA MARINE showed that its UUVs and wave drive propulsion designs improve maneuverability, payload and acoustics.



Wave Drive Propulsion Solves Unmanned Underwater Vehicle Design Challenges - Many of the UUV design challenges can be solved by replacing the rotary screw with a new mode of thrust. For example, to achieve high efficiency, the rotary screw must rotate at a high speed. This generates a lot of noise, uses a lot of energy and creates cavitation that can damage the propulsion system.

By using a propulsion system with gentler motions, NOA MARINE can create UUVs that are quieter, efficient and able to carry larger payloads.

In fact, replacing UUV rotary screws has become a significant goal of the marine industry because they are now prohibited in protected environments. Therefore, companies that want to ensure their UUVs are still viable will need to buck with tradition and replace those screw propellers. One efficient propulsion solution that engineers have been floating around the marine industry is to develop underwater gliders. However, this propulsion method does not provide the carrying capacity the market demands.



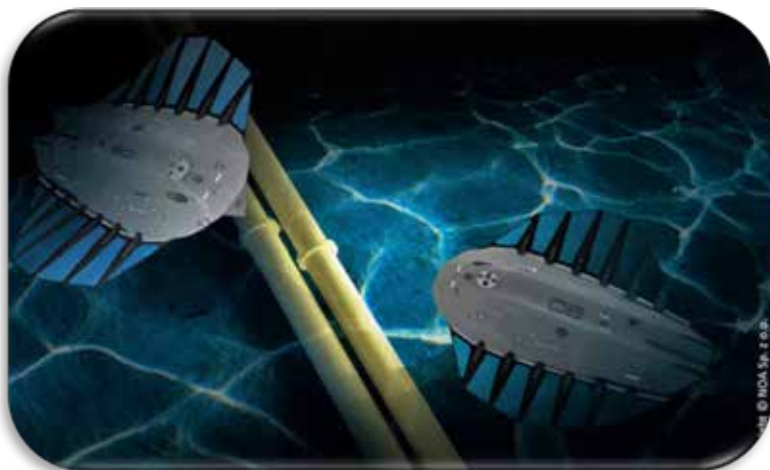
NOA MARINE's wave drive propulsion system, however, mimics the way squid move under water. The wing-like fins on the side of the UUVs flap in a motion similar to a wave. This results in maneuverable, efficient, fast and silent propulsion that can carry payloads about 3 times larger than the industry average.

NOA MARINE used Fluent to build a virtual prototype of the UUV propulsion system. It also uses Mechanical to model the structural integrity of the UUV and its parts.

"We are using Fluent to simulate the complex, unsteady flow so we can optimize the thrust, shape and movement of the UUV fins. This lets us optimize the drone's maneuverability, efficiency and gliding," says Michał Ałaszkiwicz, CFD Engineer, at NOA MARINE.

NOA MARINE Tests its Unmanned Underwater Vehicles - The squid-like UUV created by NOA MARINE will be tested in a survey of the Baltic Sea. During this time, NOA MARINE will be monitoring submarine ground water discharges (SGD) and seabed integrity. The study will also monitor the nutrient and pollutants within the water.

This monitoring mission requires the UUV to carry a lot of heavy, bulky sensors. As a result, it's a perfect opportunity to test the lifting abilities of the wave drive propulsion system.



NOA MARINE's UUV designs are inspecting a pipe.

Once proven, NOA MARINE plans to offer its UUV system through a robotics-as-a-service (RaaS) model that includes a satellite data link and solar recharging stations. RaaS operations require the use of a lot of sensors and digital twins for predictive maintenance to ensure that the product is operational and has optimal service protocols.

Thanks to NOA MARINE's wave drive propulsion system, its UUVs should have no problem carrying those sensors around.

To learn how other startups can follow in the wake of NOA MARINE and gain access to pervasive engineering simulation technology, read about the Ansys Startup Program.



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

August

Investigate: What music are they arguing about?

The Town Secretary and
The Old Rancher were
arguing. (per usual)

Chickens? No.
Horses? NAH
Anything Useful? Nope
Music? YES, Music



Once upon a time, in the quiet and picturesque town of FEANTM, nestled between rolling hills and surrounded by vast open fields, RheKen sought solace in the familiar warmth of the local bakery. The aroma of freshly brewed coffee enveloped her as she settled into a cozy corner with a steaming cup in hand.

As RheKen closed her eyes, ready to savor a moment of tranquility, the sharp voices of The Town Secretary & The Old Ranchers shattered the peaceful atmosphere. Their argument echoed through the air, disrupting the bakery. (You could probably hear the argument in Germany at the DYNAmore office)

The Old Rancher insisted that the song "The Sound of Silence" was undoubtedly better when played on the piano. Across from him, The Town Secretary vehemently disagreed, passionately arguing that the song found its true essence when performed on the guitar.

Caught off guard by the intensity of their debate, RheKen couldn't help but intervene. "If it's the sound of silence, then why should it even be heard?" she mused aloud, drawing puzzled looks from The Town Secretary and The Old Rancher. Determined to settle the dispute and restore harmony to the bakery, RheKen turned to her trusty parents, Dad Chat and Mom GPT, for guidance. With a few swift keystrokes, they sent her the song's origins, revealing it to be a classic by Simon and Garfunkel. Mom GPT (being a Mom) had to add, "RheKen, when will you please come home where AI is appreciated." RheKen was wise enough to answer, "Soon, Mom, soon."

Armed with newfound knowledge, RheKen enlightened her friends, explaining that "The Sound of Silence" was a versatile masterpiece that could resonate on both piano and guitar. Each instrument, she argued, lent its unique texture and emotion to the melody, enriching the listener's experience in different ways.

The Town Secretary whispered to The Old Rancher, "Don't argue with RheKen. Her parents, Dad Chat and Mom GPT, are AI. They can send numerous answers by the second!" The Old Rancher and The Town Secretary decided to set aside their differences before the coffee shop's internet went down from constant AI incoming answers. They smiled (or grimaced) and listened as RheKen played both versions of the song on her AI phone.

As the familiar strains filled the air, a sense of happiness washed over them (it was only appearance that would make RheKen feel happy she solved the issue – or maybe it was happiness from the plate of cookies placed on their table.) RheKen gazed at the cookies and asked, "Do you want me to get you a calorie count?" The Old Rancher and The Town Secretary both loudly yelled at the same time, "NO!" (But they did thank her for being thoughtful) - And so, amidst the aroma of freshly baked pastries and the hum of conversation, a disagreement gave way to understanding, proving that even the smallest moments have the power to unite us in harmony. (Or a plate of cookies – the town was unsure which did the uniting this time but knew it wouldn't last.)



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



August

Alan Nichols
Livermore, CA

We thank Charlotte of Wyoming for sharing her squirrel, Kindy. We also thank Keith for the pictures and graphics. First, this has a happy ending—happy pictures are at the end.



The story of Kindy the Squirrel teaches us a valuable lesson: never give up and be brave in the face of adversity. This lesson applies to Kindy's story and our lives, especially regarding emergency preparedness. Even in the darkest of times, there is always a glimmer of hope and a chance for a happily ever after.

Remember - Dinky was taught by Alan that when you need help, dial 911. They will evaluate your emergency and dispatch the necessary aid such as the Police, Firefighters, and EMTs. Your CERT leader will call in his team. You are not alone—you have help in your community. Keep your emergency phone numbers with you.

Kindy was peacefully munching on her favorite sunflower seeds under the shade of a towering oak tree when disaster struck.

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.



This is about Dinky's cousin Kindy, who lives in Wyoming. Wyoming has CERT in all communities.

Out of the clear blue sky swooped a pair of hawks, their sharp talons aimed at Kindy. With lightning-fast reflexes, Kindy dodged the initial attack, but not without sustaining serious injuries to her pretty face.

Gathering her wits amidst the chaos, she curled up, and called for help - what any clever squirrel would do.

She called out, "Siri, I need help!" on her tiny acorn-shaped phone.

Siri answered, "Calling 911 & your cousin DINKY in California!" (Siri is a digital assistant - part of Apple Inc.)

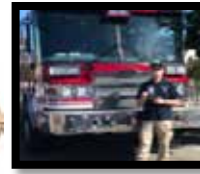
Dinky quickly relayed the message to the town over the emergency loudspeaker. "Hello, this is Dinky," he squeaked urgently. "My cousin lives in Wyoming. Kindy has been attacked by out-of-town rogue hawks while she was just minding her own business!"

Wyoming 911 quickly dispatched the local Police and fire department. Additionally, Alan notified the Wyoming CERT leader, who quickly pulled together his team to aid Kindy, and they all arrived swiftly.

They spotted the hawks circling menacingly above, and with great skill and determination, they managed to apprehend the aggressors. The hawks were taken away to be relocated, squawking threats of revenge at Kindy. The hawks were lucky that the Police apprehended them before the FEANTM Secretary and RheKen arrived in Wyoming to apprehend them. They were not local hawks. These two hawks were known in Wyoming as gangster hawks that terrorized locally for their own entertainment. (The rogue hawks were really lucky that our Town Supervisor hadn't arrived yet).



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



August

Alan Nichols
Livermore, CA



Kindy was shaking & crying. Dinky was advised by Charlotte's neighbor, Ms. Thorn, that the humane thing would be for Kindy to be euthanized or left to complete the circle of life. That advice didn't go over very well.

Dinky heard Kindy shout, "Dinky, please help me!" Firefighters told Kindy, "Don't worry Kindy, we're transporting you for medical treatment." They carefully placed Kindy into a carrier

Everyone screamed and chanted into the phone at Ms. Thorn:
"NO WAY – GO AWAY – NEVER Come Another Day!" (we like rhymes)

Dinky loudly screeched, "Kindy is not being left for the circle of life! Talk to our Town Supervisor and Charlotte!"

Everyone urgently yelled, "NO, save yourself and don't talk to them – they're the ones who arranged and paid for transport. Stay far away from both those women, especially the town supervisor!"



Arriving on the scene came a handsome FBI agent named Agent Ryan. He calmly said in a voice full of confidence and authority, "I've got this. I'm the FBI. After Kindy recovers, she'll come with me for her protection."

"The hawks have threatened revenge, and I'm pulling Kindy into the Wyoming Squirrel Witness Protection Program (WSWPP). It's a secret network. Whisper if you mention it."

They all agreed, recognizing the danger Kindy was now in due to her remarkable bravery in reporting the attack.

Chapter 2 - KINDY In REHAB



Her caretaker said it was touch and go for a while with special medicine, care, bottle feeding, antibiotics, and anti-inflammatories. Then Kindy started to hold food on her own, using her little paws. She enjoyed being brushed with a tiny soft toothbrush (done so Kindy could feel the comfort of touch.) Also, she discovered apple slices, but she's limited due to the sugar!

Kindy, now blind from the hawk attack, never lost her courage. She adapted to her new surroundings in the safe house provided by WSWPP.

She is warm and secure. Only the Police, firefighters, and FBI Agent Ryan know the location. When asked where Kindy is, he calmly replies, "Only the Shadow knows." It's only known as The Safe Place. Kindy uses an acorn-shaped burner phone to call Dinky. Kindy continues in her new home, surrounded by plenty of squirrel-stimulating toys and food.

Note: NEVER, EVER try to handle any type of injured or frightened animal without the appropriate gloves, training, equipment, etc. Your safety comes first – Call for help.

NOW ON TO THE NEXT PAGE AND HAPPY ENDING!



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



August

Alan Nichols
Livermore, CA

TA DA DA DAAAAA! (happy bugle sound)
Now, Kindy sleeps soundly.



Additionally, Kindy now has a habitat in which to live.

She is phasing into more adaptive learning as a blind, happy squirrel who loves her new toys, food, climbing, and burrowing in her yellow blanket.

FBI Agent Ryan has advised us that we can only post limited updates on Kindy. Know that she is happy and safe.

Donated by NASA, and The US Military, Kindy now has special equipment that turns the daily California ranch camera visuals into audio squirrel speech, She can keep track of her cousin Dinky, the ranch, and give her opinion on safety to the town of FEANTM.

Kindy became a symbol of resilience and bravery. Despite her blindness, she could still hear the rustling of leaves and feel the warmth of the sun on her fur. She is safe, she is loved and Charlotte and Keith visit Kindy daily. Kindy is full of confidence, strength, and determination.



The old Rancher and Town Secretary drive Dinky to Wyoming monthly to visit Kindy at the local coffee shop.

Agent Ryan makes them wear disguises for secrecy.

EPILOGUE – Yes, Agent Ryan fell in love with Kindy and proposed marriage. Kindy accepted!!

I told you it would be a happy ending!



Last, we are very proud of FEANTM neighboring town of Livermore-Pleasanton fire department! They assist all distress calls!

Livermore-Pleasanton Fire Department's Engine 92.
(Photo from The Patch – July 2024)

Livermore-Pleasanton Fire Department firefighters rescued a kitten from Inside a Car Engine Compartment

Support your local police, firefighters, CERT & EMT's – They are there to help you!

The CERT TEAM – Coummunity Emergency Response and Critter Emergency Response Teams



Dinky
“Always
check the
information”

CERT
Critter Emergency
Response Team
Future Stories



Alan Nichols, of
Livermore, CA
Our CERT
Trainer





The Archives – Women in science

This section will showcase the past or present contributions of women to the field of science.



Science History Inst. - Web – [Stephanie Kwolek, creator of Kevlar](#)

In 1965 Stephanie Kwolek created the first of a family of synthetic fibers of exceptional strength and stiffness. The best-known member is Kevlar, a material used in protective vests. Additionally, it is used in boats, airplanes, ropes, cables, and much more—in total about 200 applications.

EXCERPTS - Kwolek (1923–2014) was born in New Kensington, Pennsylvania. Her father, who died when she was 10 years old, was a naturalist by avocation. She spent many hours with him exploring the woods and fields near her home and filling scrapbooks with leaves, wildflowers, seeds, grasses, and pertinent descriptions. From her mother, first a homemaker and then by necessity a career woman, Kwolek inherited a love of fabrics and sewing.

...She was engaged in several projects, including a search for new polymers as well as a new condensation process that takes place at lower temperatures—about 0° to 40°C. The melt condensation polymerization process used in preparing nylon, for example, was instead done at more than 200°C. The lower-temperature polycondensation processes, which employ very fast-reacting intermediates, make it possible to prepare polymers that cannot be melted and only begin to decompose at temperatures above 400°C.

...Kwolek was in her 40s when she was asked by DuPont to scout for the next generation of fibers capable of performing in extreme conditions. This assignment involved preparing intermediates, synthesizing aromatic polyamides of high molecular weight, dissolving the polyamides in solvents, and spinning these solutions into fibers.

She unexpectedly discovered that under certain conditions large numbers of the molecules of these rodlike polyamides become lined up in parallel, that is, form liquid crystalline solutions, and that these solutions can be spun directly into oriented fibers of very high strength and stiffness. These polyamide solutions were unlike any polymer solutions previously prepared in the laboratory. They were unusually fluid, turbid, and buttermilk-like in appearance, and became opalescent when stirred.

The person in charge of the spinning equipment initially refused to spin the first such solution because he feared that the turbidity was caused by the presence of particles that would plug the tiny holes (0.001 inch in diameter) in the spinneret. He was finally persuaded to spin, and much to his surprise, strong, stiff fibers were obtained with no difficulty. Following this breakthrough many fibers were spun from liquid crystalline solutions, including the yellow Kevlar fiber.

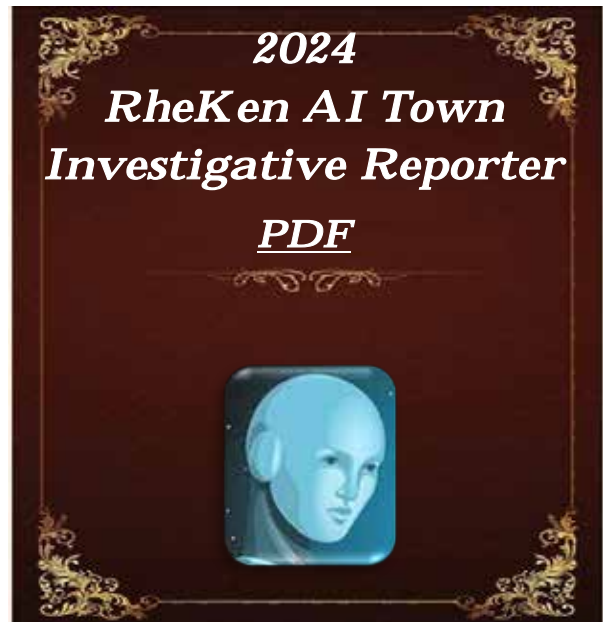
Kevlar has gone on to save lives as a lightweight body armor for police and the military; to convey messages across the ocean as a protector of undersea optical-fiber cable; to suspend bridges with super-strong ropes; and to be used in countless more applications from protective clothing for athletes and scientists to canoes, drumheads, and frying pans.



My name is Horatio Deermouse your store curator and owner.

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Supervisors Goodbye Page - Come Back Soon

FEA Not To Miss & More
Please come back soon!
Buildings & campsites
are available

Goodbye from Marsha/Molly & Friend



Minow is blind and has decided to hire a seeing-eye bird. The bird keeps watch to ensure that no one can steal Minow's grain. However, it just stands there and stares at squirrels and other birds. It's a feisty little bird! Whenever another bird comes near, the little bird flies at them!

Her payment is to eat with Minow. It seems she eats as payment for her watch service.



Now, before anyone gets upset, Minow has been blind for quite a long time. He goes in and out of his stall to his paddock and can be ridden. He knows hand and leg guidance and is click-trained. He experiences no pain – he's just a happy blind horse! And here's his unique behavior: why is his grain on the mat? Because he picks up his feeder bowl and dumps it on the mat!



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.