STAR-CCM+ : The world's most comprehensive engineering simulation inside a single integrated package, It's also an entire engineering process for solving problems involving flow (of fluids or solids), heat transfer and stress.

Going forward, We are glad to invite your students to take part in our '**Summer Internship Program**' happening during the month of June (i.e., 15th June) **2016** to 1st week of **August** 2016 for M.Tech & B.Tech Students, In this regard I request you to let us know your

students interest to explore this opportunity with us to help achieve our goals.

Topics of Interest : Students are advised to share the topic that they wish to pursue.

The key benefits that students can take advantage of the following programs will include access to:

- Library,
- Complete Guidance & Support during the Program
- Employees & Staff
- Interact with Development & Technical Support Team
- Dedicated PC or Laptop support etc.,

STAR-CCM+®

FLUID STRUCTURE PARTICLES ACOUSTICS THERMAL RHEOLOGY REACTIONS ELECTROCHEMISTRY

CD-adapco®

DISCOVER BETTER DESIGNS. *FASTER.*

THE CHALLENGE OF ENGINEERING

As an engineer, it is critical that you can predict the outcome of design changes on the real-world performance of your products. To be effective, these predictions must be delivered early and often in the development process, providing a constant stream of data that influences your product from the beginning of its design until the end.

THE STAR-CCM+ SOLUTION

STAR-CCM+ is an all-in-one solution for multidisciplinary engineering simulation, built on the philosophy that simulation should empower engineers to discover better designs, faster. It delivers accurate and efficient simulation technologies through a single integrated user interface and automated workflows. This facilitates the analysis and exploration of complex real-world problems. With STAR-CCM+, you can predict product performance at a fraction of the cost of experimental testing and get the necessary engineering data to guide your product design process.

THE BOTTOM LINE

In a recent survey of our STAR-CCM+ customers, 96% of 1,100 respondents reported that they realized at least one of the benefits below by introducing STAR-CCM+ into their product development process:

- ☑ **Improved product quality**
- ☑ **Meet client requirements**
- ☑ **Fewer field failures**
- ☑ **Avoided product recalls**
- ☑ **Reduction in number of physical prototypes**
- ☑ **Faster time to market**
- ☑ **Reduced manufacturing costs**
- ☑ **Better understanding of product behavior**

Jaguar F-Type cabin ventilation (Courtesy of Jaguar Land Rover)

AT THE CUTTING EDGE OF TECHNOLOGY
with three major releases each year

Every release of STAR-CCM+ provides a broad range of new features and enhancements. The aggressive development schedule ensures that we continuously deliver innovative technologies to broaden your application scope and respond quickly to your evolving simulation needs. As a CD-adapco customer, you have the ability to discuss the future direction of STAR-CCM+ through the IdeaStorm innovation forum. This user community enables you to submit, vote and comment on new development ideas for the tool.

"Prototypes at JLR can be very expensive. If we can save a prototype, the software is paying for itself. For systems such as the defrost system, we no longer build any prototypes apart from the final model. We rely totally on STAR-CCM+ to design the system."

Karamjit Sandhu
Jaguar Land Rover Limited

BACKED BY A STAFF OF GLOBAL EXPERTS
committed to your success

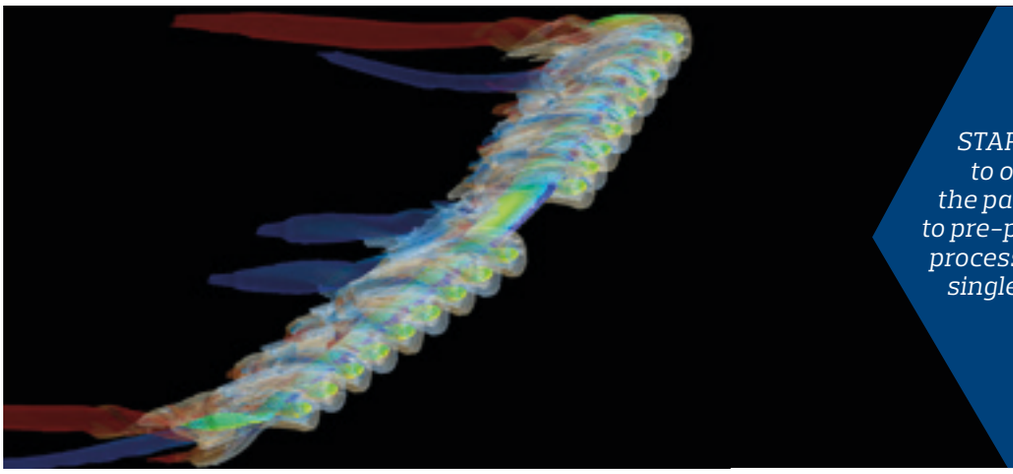
As a STAR-CCM+ user, you are assigned a dedicated support engineer, specifically tasked with understanding your simulation goals and helping you maintain productivity. Support queries can also be managed through our online customer support portal where you can access a comprehensive knowledge database as well. Furthermore, to ensure you hit the ground running with STAR-CCM+, we offer a large selection of both e-learning and instructor-led training.

"We are always waiting for the next release, because we know that in that release, there is something valuable for us. We can actually make an enhancement request on the Steve Portal and after one year or so, the capability we asked for is implemented in STAR-CCM+. Amazing, they listen to us!"

Simone Ferrari
Bottero S.p.A.

AFFORDABLE WITH INNOVATIVE LICENSING
making the most of your compute resources

In a world where sophisticated models and multidisciplinary design exploration are becoming the norm, it is critical that license costs don't limit your engineering ambitions. Our affordable Power Licensing gives you access to all of the multidisciplinary capabilities of STAR-CCM+ at a much lower cost than traditional licensing schemes. We offer three innovative licensing options, giving you unlimited cores for a single fixed price, enabling you to run on the cloud, and making design exploration affordable.



"The usability of STAR-CCM+ is great compared to other codes I have used in the past, especially when it comes to pre-processing, solution and post-processing, all accomplished from a single integrated user interface."

Alex Stoll
Joby Aviation

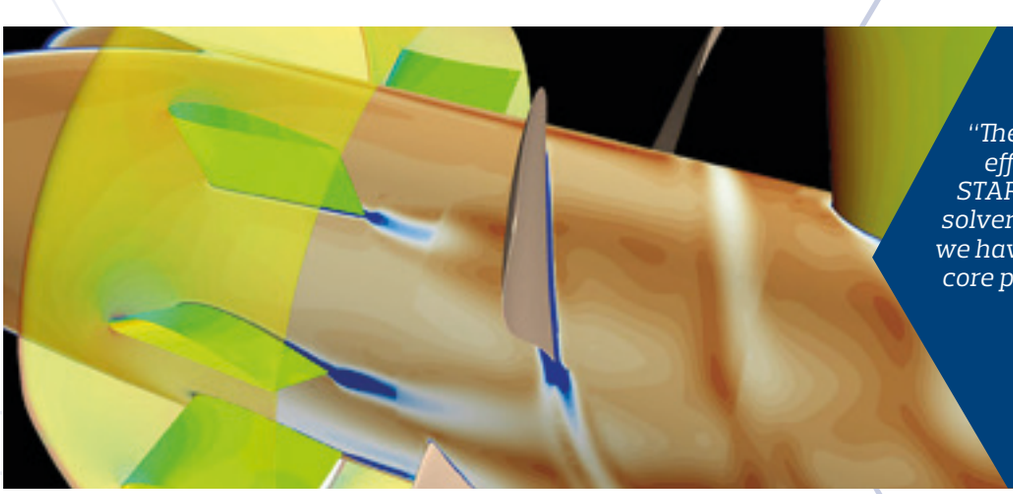
Aerodynamic simulation of leading edge propellers of the LEAPTech wing (Courtesy of Joby Aviation)

SINGLE INTEGRATED USER INTERFACE
facilitating innovation and collaboration

With STAR-CCM+, there is no need for you to compromise between usability and functionality. It provides accurate and efficient multidisciplinary simulation technologies from within an intuitive single integrated user interface. The integrated approach makes it easy for you to explore a range of configurations and scenarios involving complex geometries and spanning across engineering disciplines. STAR-CCM+ provides engineering solutions for your enterprise, whether you are a new design engineer or an R&D simulation expert. The single integrated user interface makes it easy to learn and deploy, facilitating innovation and collaboration.

WORKFLOW AUTOMATION
enabling design space exploration

You can automate your entire simulation workflow from geometry to data analysis, using a repeatable and robust pipelined approach and JAVA macros. This allows you to efficiently drive design changes and achieve your engineering objectives. You can also easily deploy your best practices with tools such as the simulation assistant, eliminating analyst-to-analyst variations and giving you greater confidence in your results.



"The ease of use, robustness, efficiency and accuracy of STAR-CCM+ meshing tools and solver, proven over the years that we have been using it, makes it the core part of our highly automated design process."

Steven Leonard
IBMV

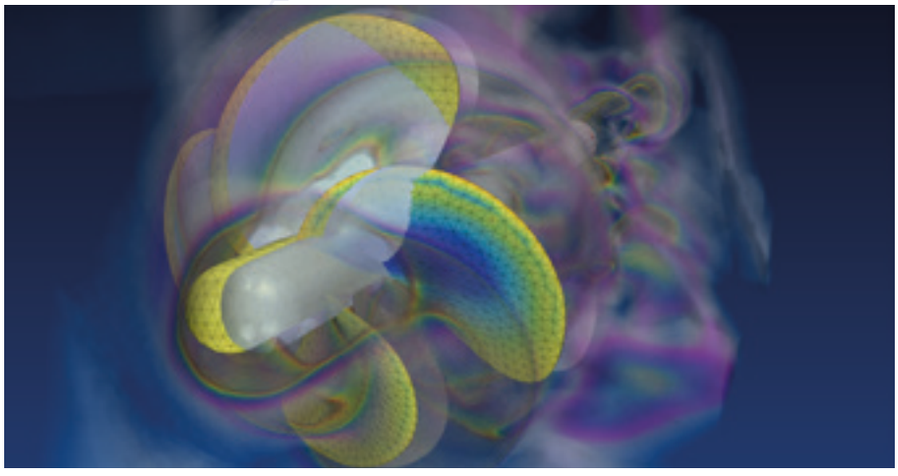
Vorticity magnitude inside the duct showing the effect of a rotating propeller (Courtesy of IBMV)

CUTTING EDGE MULTIPHYSICS PLATFORM
covering your complete application scope

You can solve sophisticated industrial problems with one single simulation model that hosts the geometry, the mesh, all the required physics and the analysis results. This enables you to take into account a wide range of physics across multiple engineering disciplines.
STAR-CCM+ offers both a finite-volume and a finite-element method, giving you the most appropriate numerical schemes for the physics being modeled. It can also couple with third party codes (in-house, commercial) through its co-simulation API, bringing you the flexibility to use the right tool for the job.

"CD-adapco offers services and software designed by engineers for engineers. It's not just an engineering software from software engineers. It definitely is a tailored, process-driven and result-oriented engineering solution from engineers to engineers."

Erwin Schnell
HBI Härter AG



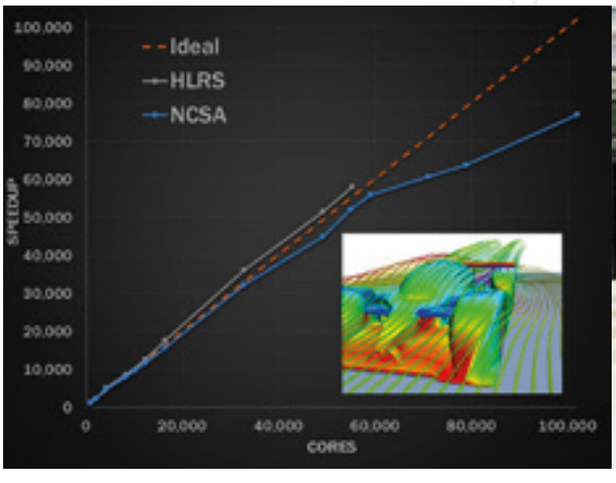
Fluid-structure interaction of a ship's propeller from a single integrated user interface

"Ten years ago, it took three weeks to a month to get HVAC simulation results. Today, with STAR-CCM+, I am able to simulate a complete HVAC system in just one day."

Petr Nekolny
Valeo Autoklimatizace k.s.

MASSIVELY PARALLEL PERFORMANCE
achieving quick turnaround of results

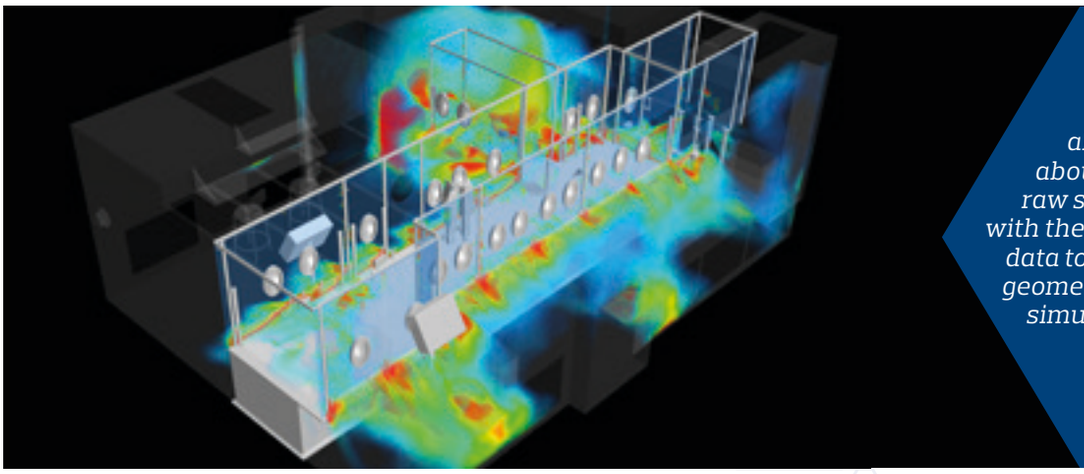
High Performance Computing significantly accelerates the pace of your product design cycles using simulation. As computing power continues to grow exponentially and becomes more affordable, STAR-CCM+ is designed to make the most out of the computational resources available.
STAR-CCM+ is massively parallelized, from meshing to solution, and it scales to hundreds of thousands of cores. This allows you to push the boundaries of your simulations, from solving single large-scale analyses to studying hundreds of variants for simulation-led design.



Extreme scalability with STAR-CCM+ on National Center for Supercomputing Applications (NCSA) and High Performance Computing Center Stuttgart (HLRS) supercomputers

©Boris Lehner for HLRS

The Cray XC40 Hazel Hen at High-Performance Computing Center Stuttgart (HLRS)



"Creaform uses STAR-CCM+ in its software arsenal as it allows us to quickly treat about any geometry, including raw scans. Our experts can work with the scans and any other available data to numerically reconstruct the geometry and then perform the CFD simulations, cutting down costs and intermediaries."

Phillipe Vincent
Creaform

Clean room simulation (Courtesy of Creaform)

AUTOMATIC GEOMETRY CREATION AND PREPARATION
saving valuable engineering time

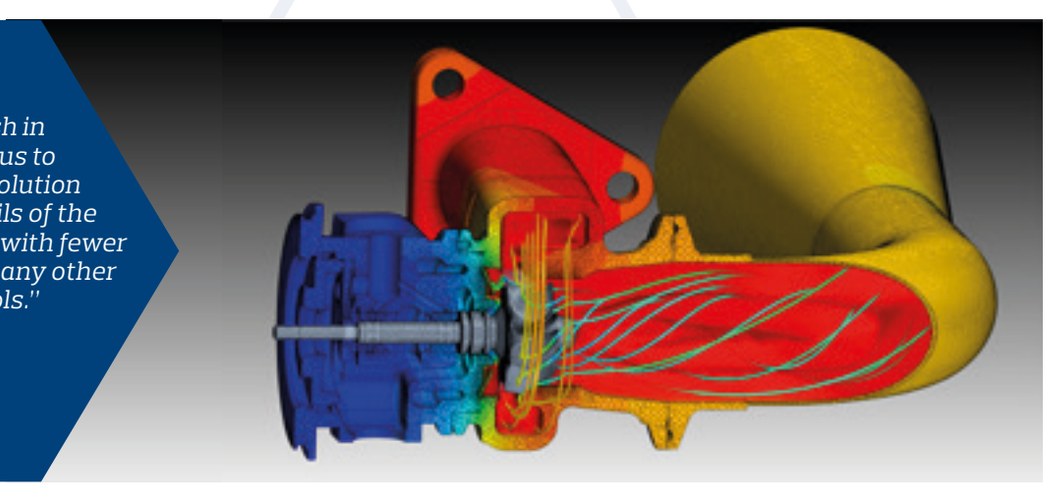
Dealing with the consequences of imperfect CAD has long been a bottleneck for simulation. STAR-CCM+ helps you maximize your productivity through a robust and automated workflow for ensuring complex geometries are ready to mesh:

- A fully parametric 3D feature-based modeler to create, modify, and de-feature CAD.
- Bi-directional link between STAR-CCM+ and CAD/PLM software for geometry transfer and modification.
- Intuitive manual repair tools and fully automatic surface wrapping for preparation of imported geometries.

The pipelined approach allows for automatic preparation of geometries irrespective of their source and enables efficient design exploration.

"The polyhedral mesh in STAR-CCM+ enables us to establish very high resolution grids capturing the details of the geometry much faster and with fewer cells than is possible with any other kind of meshing tools."

Karsten Kursterer
B&B-AGEMA



Micro gas turbine conjugate heat transfer (Courtesy of B&B-AGEMA)

FLEXIBLE AND REPEATABLE MESHES
generated in hours instead of weeks

No matter how complex your geometry, the meshing technologies in STAR-CCM+ enable you to fully automate your meshing process, yet they are flexible enough to give you fine grained mesh control when required:

- Parallel meshing to fully utilize available hardware resources.
- Comprehensive set of state-of-the-art meshers including polyhedral, trimmed-hexahedral and swept mesh types for a wide range of applications.
- Robust generation of prism layers ensuring accurate capture of boundary layers.
- Automated and fully conformal meshing for multi-domain studies such as conjugate heat transfer.
- Specialized meshing for specific applications including thin mesher, extruder and 2D meshing.

ACCURATE MULTIDISCIPLINARY RESULTS
predicting real-world performance of your products

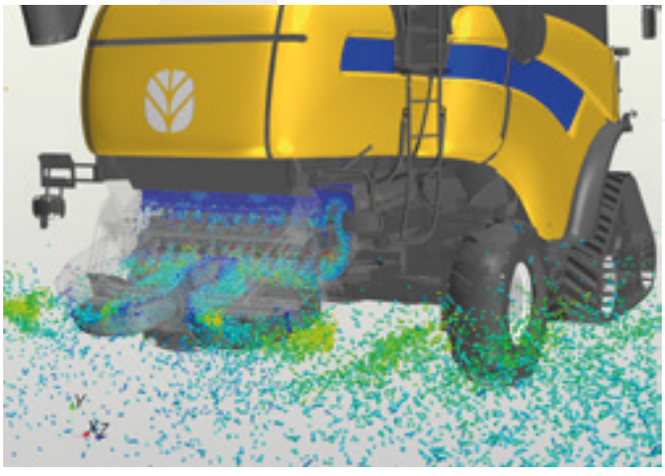
The integrated multidisciplinary approach of STAR-CCM+ enables physical phenomena to be studied in a fully coupled manner. This reduces approximation, giving you confidence that the predicted behavior of your designs will match the real-world performance of your product. The single integrated user interface helps you cover your complete application scope with:

- A broad range of validated models to simulate disciplines and physics including: Computational Fluid Dynamics (CFD), Computational Solid Mechanics (CSM), heat transfer, multiphase flow, particle dynamics, reacting flow, electrochemistry, acoustics and rheology.
- Simulation of rigid and flexible body motions with techniques including mesh morphing, overset meshes and six degrees of freedom.

You can also combine the various physics and motion models in a single simulation to cover your specific application.

"The ability to effortlessly read CAD data, mesh a geometry, select boundary conditions, and set up physics models in STAR-CCM+ has tremendously sped up our design process. We've been able to deepen our analysis and drive engine designs faster and more effectively with the same resources as before."

Jeff Schlautman
General Motors



Residue handling simulation on combine using DEM (Courtesy of CNH Belgium N.V.)

Streamlines through an engine compartment (Courtesy of InDesA GmbH)

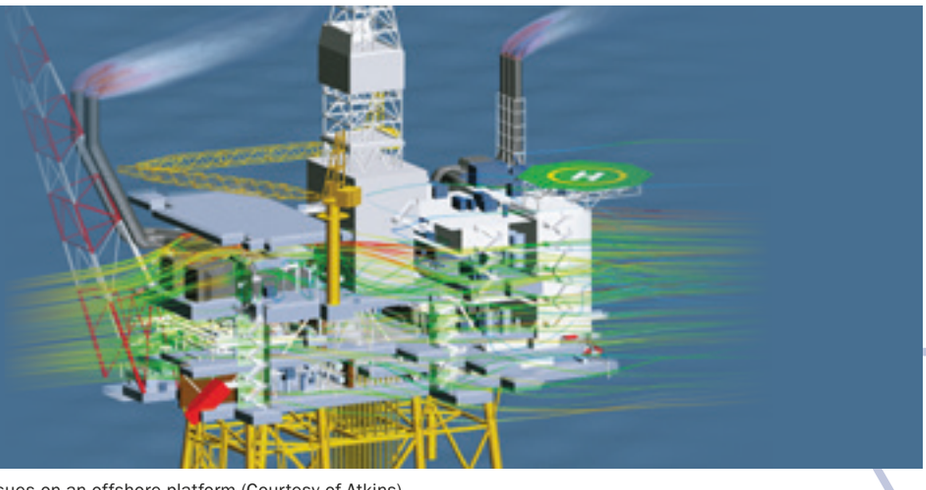
POWERFUL DATA ANALYSIS
helping you make design decisions with confidence

The keystone to effective engineering analysis is the ability to easily understand and communicate your simulation results to colleagues and customers. STAR-CCM+ integrates a range of powerful analysis and visualization tools to help you and your team arrive at critical design decisions quickly and with confidence:

- Live processing of solution progression, enabling on-the-fly assessment of results and changes to design and analysis parameters.
- Quantitative data analysis for reporting and monitoring of engineering data.
- High impact qualitative visualization to better understand and communicate your results.
- Collaborative decision making tools to review and share your design results across the organization and with customers and partners.

"With an intuitive interface, powerful automation capabilities, integrated meshing, pipelined process and comprehensive post-processing abilities, STAR-CCM+ is a powerful and efficient solution. This has helped Atkins play a key role in advancing the use of simulation for technical safety studies for oil and gas operations across the globe."

Ian Cowan
Atkins



Consequence modeling analysis of safety-related issues on an offshore platform (Courtesy of Atkins)

"We completed an extensive evaluation of different products, but at the end of the day we had a clear winner in the efficiency and flexibility of STAR-CCM+, the new optimization package Optimate and the outstanding technical support from CD-adapco."

Rodrigo Azcueta
Land Rover BAR

DESIGN EXPLORATION WITHIN STAR-CCM+

enabling you to discover better designs, faster

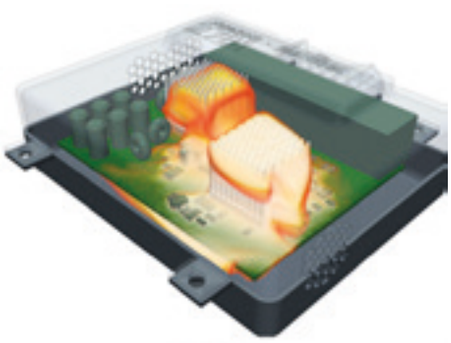
STAR-CCM+ gives you direct access to design exploration and optimization technologies, making iterative design studies seamless and efficient. The robust and repeatable pipelined workflow in STAR-CCM+ is a key enabler of multidisciplinary design exploration using the Optimate add-on:

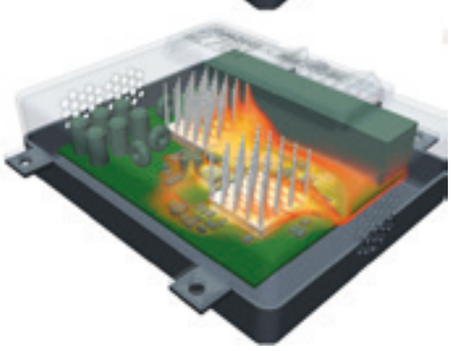
- Automated process for setting up, executing and post-processing design studies including parameter sweeps, design of experiments and single and multi-objective design optimization.
- Efficient hybrid adaptive optimization algorithm with a blend of search strategies leveraging the best of all methods and exploring the design space locally and globally at once.

STAR-CCM+ also offers an adjoint method for shape optimization and economical sensitivity analysis:

- Shape optimization: get insight and morph the geometry to improve your designs.
- Uncertainty quantification: understand how uncertainties affect your solution.
- Inverse problems: understand which part of the geometry has the greatest influence on your results.

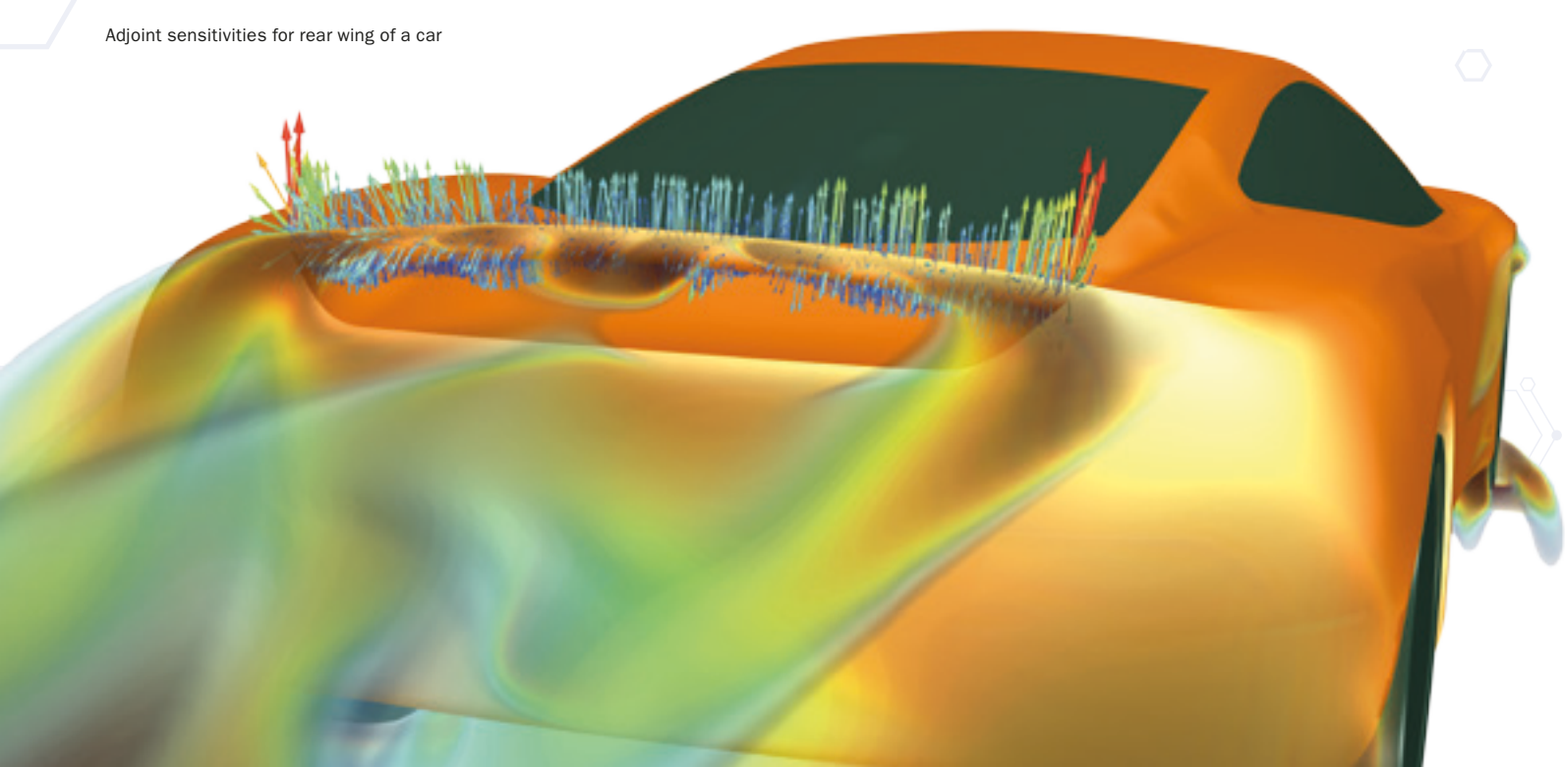
Optimate and the adjoint method in STAR-CCM+ can be used together to get the most out of your design exploration. Users can start their multidisciplinary design exploration with Optimate to get an initial design and continue to fine-tune it using the adjoint approach.





Thermal control module design with Optimate

Adjoint sensitivities for rear wing of a car



DESIGNED WITH STAR–CCM+

leading to your success

Don’t just take our word for it. Visit www.cd-adapco.com and explore hundreds of our customer case studies.

Rotorcraft Hub Drag
Sikorsky Aircraft

Free Falling Lifeboat GES52
CFD Marine

Windshield De–Ice/Defog Performance
Jaguar Land Rover

Evaluating Design Considerations for the Next Generation
Joby Aviation

A Cost Effective Computational Tool for Offshore Design
Technip

Downstream: Industrial Heater: Improved Performance
Zeeco

Computing Hydrodynamic Loads of a Complete Ship Model
Force Technology

Hemodynamic Effects of Shunt Placement in Hybrid Norwood Operation
UCF/Arnold Palmer Hospital for Children

Coupled Electrical–Thermal Simulation
Zumbotel

INDUSTRIAL STRENGTH ENGINEERING SIMULATION

supporting a wide range of industries and applications

AEROSPACE
Aerodynamics
Propulsion
Thermal
Aeroelasticity
Aeroacoustics
Icing
Store separation
Environmental Control System (ECS)

ENERGY
Gas & steam turbines
Compressors
Combustion
Pumps
Balance of Plant (BOP)
Renewable energy
Nuclear energy
Energy Storage Systems (ESS)

OIL AND GAS
Drilling
Erosion
Offshore wind studies
Reservoir modeling
Well containment
Green water loading
Subsea thermal
Separator analysis

MARINE
Aerodynamics
Hydrodynamics
Propellers
Sloshing
Mooring
LNG evaporation
Fluid-Structure Interaction (FSI)

GROUND TRANSPORTATION
Aeroacoustics
Aerodynamics
Thermal heat protection
Powertrain
Manufacturing
Cabin comfort

CHEMICAL PROCESS
Mixing and stirred reactors
Particulate flow
Combustion
Cyclone separation
Packed bed reactors
Safety and environment

ELECTRONICS
Natural convection cooling
Forced convection cooling
Conduction cooling
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