Multiphysics lecturer relies on Coreform Cubit

A postdoctoral instructor at Austria's TU Graz tried all the most widely-used meshing software options for students. He chose Coreform Cubit for its ease-of-use and powerful feature-set.

Graz University of Technology (Technische Universität Graz, or TU Graz) is a leading public university located in Austria's second largest city. Founded in 1811, it counts Nikolas Tesla among its alumni, and is now home to more than 13,000 students and 96 faculty research institutes.

> **Once you use Coreform Cubit for scripting automated mesh generation, you will never go back.**
>
> — *Dr. Klaus Roppert*

Dr. Klaus Roppert holds a postdoctoral position at TU Graz's Institute for Fundamentals and Theory in Electrical Engineering (IGTE). A central research focus of IGTE is the numerical modeling and simulation of acoustics, electromagnetics, mechanics, and heat transfer, and especially their interactions. Dr. Roppert accordingly teaches courses on finite element method (FEM) theory and practice, including both basic and advanced classes on multiphysics simulation.

THE PROBLEM

To further its multiphysics research and teaching, IGTE has recently co-developed the open-source, coupled-field, finite element solver *openCFS* (https://opencfs.org/). An active *openCFS* contributor, Dr. Roppert uses the software regularly for class demonstrations and practical laboratory assignments. What he required was an accompanying preprocessing software.

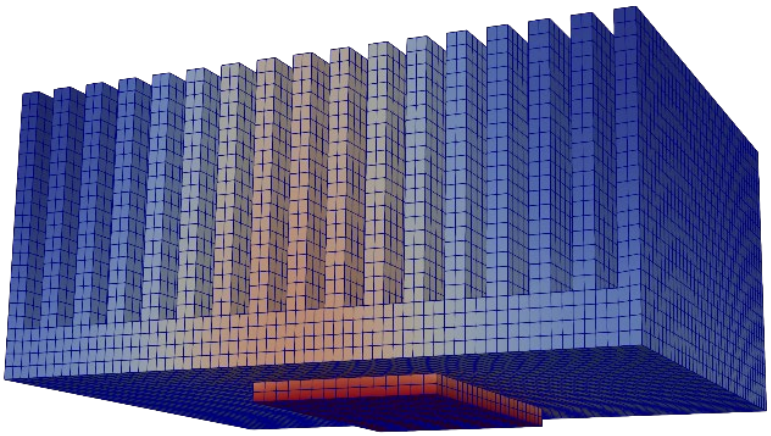

Figure 1: CPU cooler meshed in Coreform Cubit for a thermo-mechanics classroom simulation performed by TU Graz students.

The preprocessor needed to be able to handle the complex problems that would arise in the advanced class, while being easy enough to use and follow for the new students in the beginner class. Dr. Roppert tried a number of options, including the industry's most widely-used preprocessors.

TU Graz's institutional adoption of *openCFS* makes integrated mesher-solver options superfluous and distracting. And Dr. Roppert found that of the leading standalone preprocessors, many were either needlessly complicated to use, while others lacked sufficient power and control to handle the real-world problems he would be demonstrating.

THE SOLUTION

To support both new users and advanced finite element cases, Dr. Roppert required a combination of powerful preprocessing capabilities and straightforward usability. Coreform Cubit, he says, was "the clear winner."

Coreform Cubit, he reports, has been able to handle every type of problem his teaching demands. Moreover, its ease of use and learnability make it optimal for classroom

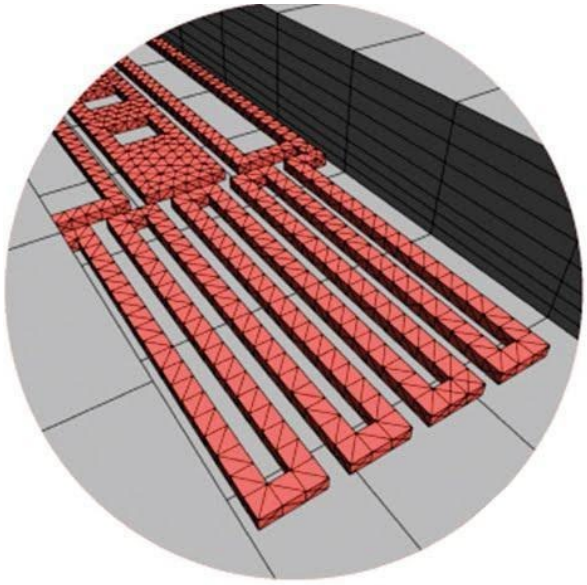

Figure 2: A semiconductor device meshed in Coreform Cubit for an electro-thermo-mechanics simulation performed by TU Graz students.

explanation and assignments. Using Cubit, he says, enables his students to "focus on simulation instead of meshing." In addition, because it has been used globally for over two decades for challenging industrial and academic engineering problems, it is also a valuable tool for his students to learn in its own right.

Dr. Roppert begins his course by showing students how to use the basic Coreform Cubit GUI. Since multiphysics requires many parameter studies, he also makes heavy use of Cubit's powerful scripting capabilities, demonstrating how to run mesh scripts on Linux with Coreform Cubit. "Once you use Coreform Cubit for scripting automated mesh generation," he says, "you will never go back."

CONCLUSION

Coreform Cubit proved to be the best option for meshing multiphysics simulation problems for Dr. Klaus Roppert's multiphysics classroom. Cubit was readily able to handle tough 3D problems that other meshers had trouble with, allowed for faster simulations, and was also the easiest for students to learn.

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Coreform Cubit academic licensing allows for discounted versions of Cubit for academic research and teaching.

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