Innovating the engineering profession

Innovation is hard to teach and hard to predict, but the 15 technologists highlighted in this issue provide insights into the process.

INNOVATION DRIVES OUR industry. Your ability to innovate attracts customers to your company's products, and your suppliers' ability to innovate produces the components and software that, in turn, enable innovation on your part.

Innovation is easy to recognize. You'll find it highlighted throughout each issue of *EDN*, and *EDN* annually confers innovation awards to highlight particularly outstanding examples (see *EDN*, May 1, 2008, pg 27).

Nevertheless, innovation seems to be rather elusive. For example, it's hard to predict. You can assign a certain number of engineer-hours to a project, but you can't guarantee that any specific level of innovation will happen. And innovation can't readily be taught—universities can teach Ohm's Law and the element constraints or C# programming, but there is no guarantee that a graduate will be able to combine components and code into innovative and marketable products. In fact, the organizational demands of companies can stifle the natural creativity of entry-level engineers.

Organizational imperatives can hinder innovation at all levels. The need to meet quarterly goals can pressure design teams to get something out the door—whether it's innovative or not. Factors outside the organization can also put the brakes on innovation. The issue of standards is an obvious one, in which compliance efforts can yield "me-too" products that fail to attract annual awards—and, much more important, customers.

The difficulty with innovation is that there is no step-by-step process that you can engage in to ensure that it happens. Nevertheless, you can study the process of innovation. To that end, *EDN* editors have looked into how 14 organizations address innovation, and we relate their stories on the following pages.

Some of the stories recount companies moving in new directions—toward solar-cell fabrication or robotics software, for example, all the while maintaining competencies in their core areas of semiconductor-processing equipment or desktop computing. Other organizations are finding innovative ways to contend with hazardous-substance restrictions and to address process-variability concerns as semiconductor-process geometries shrink. One company is exploring the important role of analog in what might seem to be an increasingly digital world. Still another is introducing innovative products as the standards it will comply with evolve.

Power is a major area for innovation. Companies focused on power-related issues are developing energy-efficient consumer lighting, increasing processing power while maintaining effective thermal management, and tailoring batteries to specific applications—as opposed to forcing applications to accommodate today's battery designs.

EDA companies, too, are addressing power—tailoring their tools to support power-aware design. In addition, they are addressing new threats to quality, such as delay defects. EDA companies are also addressing increasingly important areas, such as DFM (design for manufacturing) and ESL (electronic-system-level) design.

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Some of the technologists we present here share their insights on how to innovate, but you won't find a recipe for innovation in these pages. What we hope you do find is the inspiration that can keep you up to date as the engineering profession undergoes its own round of innovation. And that round of innovation could, in fact, make the role of the unprepared, classically trained engineer obsolete, as design prowess accrues to the domain specialist who can complete an innovative product without having to contend with low-level programming and transistor-level-design details.

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