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INTEL TO PUT CHIPS UPFRONT AND CENTER

MICROPROCESSOR FORUM, SET TO START TODAY IN S.J., A PLATFORM FOR NEW IDEAS

By Mark Boslet
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Intel is expected to unveil on Tuesday research plans for chips with hundreds of cores, or electronic brains, and a new way to ease the bottleneck these more complex processors will create talking to the memory in a computer.

The advances will be among more than a dozen scientific projects and products displayed at the Microprocessor Forum, a technical conference kicking off today in San Jose.

If the Intel initiatives come to fruition, they could pave the way to vastly more powerful computers and potentially resolve an emerging problem confronting computer designers with memory access.

The three-day forum, held at the DoubleTree Hotel San Jose, will draw 350 designers and engineers from companies such as Freescale Semiconductor, Advanced Micro Devices, MIPS Technologies and Nvidia. It has long been considered a venue to launch products, and this year will see several companies, including MIPS and Freescale, with new semiconductors.

But the full-court press will come from Intel scientists, who will deliver four of 21 presentations on topics as varied as the company's latest Penryn microprocessor, its most advanced 45-

nanometer manufacturing technology and its plans for futuristic multi-core chips.

Personal computers today run with a maximum of four cores. But ultimately chips with hundreds of cores will find their way into PCs, said James Held, an Intel fellow. Held declined to predict when, but said, "this is an inevitable direction," and it will dramatically change the way software is written.

Intel also will say it is exploring options for improving the way chips with many cores get data from memory. Among the techniques is one that offers different tiers of service, providing more resources and quicker access to more important software applications.

Max Baron, senior editor of the Microprocessor Report and organizer of the forum, said computer designers have long struggled with the challenge of feeding data from memory to a chip's core. Multi-core chips only exacerbate the problem because of the increased number of cores.

"Suddenly memory becomes a block — a holding back of resources," Baron said. "Intel is probably looking at reinventing memory for servers."

The forum takes place this year as the chip industry wrestles with an increase in the difficulty and complexity of making chips. Until several years ago, chip designers typically had a single focus: to make their next single-

core chip faster than the last. But as circuits on these ever smaller and speedier chips shrunk to a sub-microscopic, or nanoscale, level, power loss and heat increased to intolerable levels. To compensate, designers turned to multiple cores, which can run slightly slower because they run in tandem and waste less energy.

Complexity also has increased for manufacturing engineers trying to overcome steeper production hurdles. The result has been an overhaul of the types of materials used to build chip circuitry.

Ten years ago, engineers could foresee a decade into the future as they projected new manufacturing technology, said Mark Bohr, a senior Intel fellow. Now they can foresee improvements that extend less than five years, Bohr said.

"We are now in an era where we have to continue to innovate with new materials and structures" for transistors, Bohr said. "New materials have been introduced at a higher pace than a few years ago."

These new fundamental hurdles of physics aren't likely to disappear any time soon, said Steve Levy, chief executive of Mears Technologies of Waltham, Mass. The new materials and techniques "simply push things out a couple more years," says Levy.

Mears Technologies will discuss

at the forum a technique it has developed to change the electrical properties of silicon and enable current to flow better in one direction while resisting it in another. The procedure should cut down on power loss while enhancing conductivity where it is needed, said company founder Robert Mears.

Among the companies displaying products is Freescale, which will

unveil an embedded processor using three cores. The low-power MPC5121e will ship at the end of 2008, says Michael Bryars, business unit manager.

AMD, meanwhile, will offer new information about its mobile chip, coded named Griffin. The chip is expected in mid-2008 and its power efficiency could lead to laptops that run six hours on a battery, AMD claims.

Among its innovations is an ability

to turn on and off cores when they are not needed, said Maurice Steinmen, a fellow at the company.

MIPS plans to announce a new chip design to bring sharply higher performance to its line of embedded processors. The 74K will run at speeds above 1 GHz, compared with 600 MHz for its existing chips, says Jack Browne, vice president of marketing. The product is to ship this week.

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