

## Special Interest Group on Design Automation

### ACM/SIGDA E-NEWSLETTER, Vol. 52, No. 2

#### SIGDA - The Resource for EDA Professionals

This newsletter is a free service for current SIGDA members and is added automatically with a new SIGDA membership.

Circulation: 2,700

Online archive: <http://www.sigda.org/newsletter>

# SIGDA News

#### 1. [Biden, Intel Unveil Ohio Fab, Tout Chip Legislation](#)

President Joe Biden and Intel CEO Pat Gelsinger used the unveiling of a new Ohio chip manufacturing campus to press for passage of federal subsidies intended to revive U.S. semiconductor manufacturing.

#### 2. [AMD Acquisition of Xilinx Heats Up Competition with Intel](#)

AMD's acquisition of Xilinx in an all-stock transaction valued at \$35 billion promises to raise the stakes in the second-ranked CPU maker's competition with Intel.

#### 3. [TSMC's 2022 Expansion Budget Exceeds \\$40 Billion](#)

Taiwan Semiconductor Manufacturing Co. (TSMC) once again plans a boost in capital expenditures. This new round calls for as much as \$44 billion in 2022 to meet demand the company believes could grow by up to 20 percent during the next few years.

#### 4. [Samsung Readies Gate-All-Around Ramp](#)

Samsung Electronics said it's on track in the second half of this year to launch the world's first commercial production of chips based on its gate-all-around (GAA) process. The emerging process is likely to provide transistor density advantages over the current FinFET technology used at the 5-nm node, where Taiwan Semiconductor Manufacturing Co. (TSMC) rules the roost.

#### 5. [TI Emphasizes Fab Investments in Earnings Report](#)

Texas Instrument's fourth-quarter revenue exceeded expectations, beating estimates of \$1.94 per share on \$4.4 billion in sales with profits of \$2.27 per share on \$4.83 billion in revenue — a 19 percent increase compared to a year ago. The company attributed this gains to strong demand in industrial and automotive markets.

# Messages from the EiCs

Dear ACM/SIGDA members,

We are excited to present to you February E-Newsletter. We encourage you to invite your students and colleagues to be a part of the SIGDA newsletter. The newsletter covers a wide range of information from the upcoming conferences to technical news and activities of our community. Get involved and contact us if you want to contribute articles or announcements.

The newsletter is evolving. Please let us know what you think.

Happy reading!

*Debjit Sinha, Keni Qiu,*  
Editors-in-Chief,  
SIGDA E-News

# SIGDA EC

*Yiran Chen,*  
Chair

*Sudeep Pasricha,*  
Vice Chair and Conference  
Chair

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## 6. [Tech Giants Allude to Continued Supply Chain Disruptions](#)

Tech giants Apple, Samsung and Intel reported record revenues this past week. Other companies, such as Lam Research, weren't so fortunate, reporting lower-than-expected numbers and dwindling sales. But if there's one thing these companies can agree on, it's that supply chain disruptions are here to stay.

# What Is

## What is EDA for Wearable Flexible Healthcare Devices?

Sizhe An, Umit Y. Ogras

Flexible and stretchable electronics represent integrated circuits (IC) implemented on bendable, rollable, conformable, or elastic substrates [1]. They are lighter and thinner, hence, more amenable to wearable healthcare. Due to these advantages and low cost, flexible and stretchable patches and health monitoring devices have attracted increasing interest lately. They can transform healthcare applications by enabling bendable and stretchable wearable systems.

Flexible electronics still suffer from low performance and larger parameter variations than silicon CMOS circuits [2]. For example, state-of-the-art silicon technology offers more than GHz frequency with feature sizes as small as a few nm, whereas the frequency of thin-film transistors (TFT) hardly reaches 10 MHz with feature sizes of  $\mu\text{m}$  [1]. Flexible hybrid electronics (FHE) technology by integrating rigid silicon integrated circuits and printed electronics addresses this problem. FHE aims at combining rigid, flexible, and stretchable resources to reduce the gap between the performance of flexible devices and conventional silicon technology while preserving the form factor advantages of flexible electronics. To enhance the productivity of FHE circuit design, ideally, FHE should use the same design environment or Electronic Design Automation (EDA) tools with silicon chips for the co-design capability [2]. Outstanding design and EDA challenges include finding the optimal set of components based on these technologies, interfacing them

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AE for What is

**Muhammad Shafique,**  
AE for What is

**Rajsaktish  
Sankaranarayanan,**  
AE for Researcher spotlight

with each other, optimal integration, and test and validation under different physical conditions.

Health applications using Internet-of-Things (IoT) have drawn significant attention recently with the rapid development of machine learning. Data-intensive computing using machine learning enables pattern recognition for healthcare applications, including health monitoring, sleep monitoring, activity recognition, pose estimation, and patient rehabilitation. User studies show that comfort, maintenance (e.g., charging) requirements are among the leading reasons for abandoning wearable devices [3]. Hence, physically flexible and self-powered devices can drive the next leap forward in healthcare applications. To realize this vision, these devices must provide values, such as collecting clinically relevant data and analyzing them locally, under tight energy budgets. Hence, there is a critical need for killer applications, energy-efficient edge AI algorithms, as well as optimal energy harvesting and management. Finally, these devices must protect user privacy and ensure a secure operation since they handle sensitive information [4].

In summary, FHE has the potential to enable a breakthrough in healthcare applications due to its form factor benefits and sensing technology. Potential high-impact applications include health monitoring, sleep monitoring, activity recognition, pose estimation, and patient rehabilitation [4]. However, it is critical to address the fundamental challenges that hinder co-design capability between mainstream silicon chips and FHE.

#### References

- [1] Gupta, Ujjwal, et al. "Flexibility-aware system-on-polymer (SoP): Concept to prototype." *IEEE Transactions on Multi-Scale Computing Systems* 3.1 (2016): 36-49.
- [2] Tsung-Ching Huang et al. Process Design Kit and Design Automation for Flexible Hybrid Electronics. In 2019 Design, Automation & Test in Europe Conference & Exhibition (DATE), pages 36–41, 2019.
- [3] G. Bhat, R. Deb and U. Y. Ogras, "OpenHealth: Open-Source Platform for Wearable Health Monitoring," in *IEEE Design & Test*, vol. 36, no. 5, pp. 27-34, Oct. 2019, doi: 10.1109/MDAT.2019.2906110.
- [4] Bhat, Ganapati, et al. "Self-Powered Wearable IoT Devices for Health and Activity Monitoring." *Foundations and Trends® in Electronic Design Automation* 13.3 (2020): 145-269.

**Xin Zhao**,  
AE for Paper submission

**Ying Wang**,  
AE for Technical activities

# Paper Deadlines

## **MDTS'22 – IEEE Microelectronics Design & Test Symposium**

Albany, NY

Deadline: Feb 28, 2022

May 23-25, 2022

<http://natw.ieee.org>

## **ISVLSI'22 – IEEE Computer Society Annual Symposium on VLSI**

Cyprus

Deadline: Mar 4, 2022

July 6-8, 2022

<http://www.ieee-isvlsi.org>

## **ISLPED'21 – ACM/IEEE Int'l Symposium on Low Power Electronics and Design**

Boston University, Boston, MA  
(Hybrid)

Deadline: March 11, 2022

(Abstracts due: March 18, 2022)

Aug 1-3, 2022

<http://www.islped.org>

## **IWLS'22 – International Workshop on Logic & Synthesis**

Virtual conference

Deadline: April 18, 2022 (Abstracts due: April 11, 2022)

Jul 18-21, 2022

<https://www.iwls.org>

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# SIGDA Awards

The 2021 SIGDA Pioneering Achievement Award is granted to Rob Rutenbar for his pioneering work and extraordinary leadership in analog design automation and general EDA education. The Award will be presented at DAC 2022.

## Who's Who

### Kai Ni

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Rochester Institute of Technology

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## Technical Activities

### 1. [A Quantum Computer with 5,000+ Qubits Now in Europe](#)

The Jülich Supercomputing Center (JSC) and D-Wave Systems launched the company's first cloud-based quantum service in Europe...

### 2. [Vertical FET; emerging memories; TSMC's capex; DAC figures](#)

IBM and Samsung develop the vertical FET; Advancements in emerging memories: FeRAM, STT-MRAM, UltraRAM; Silicon Valley's startups funding doubled in 2021...

### 3. [Semiconductor Shortage Issues Migrating from Front-End to Back-End Manufacturing](#)

The semiconductor market continues to experience uneven shortages and tight supply...

### VLSI-SoC'22 - IFIP/IEEE Int'l Conference on Very Large Scale Integration

Patras, Greece

Deadline: April 25, 2022 (Abstracts due: April 18, 2022)

Oct 3-5, 2022

<http://www.vlsi-soc.com>

### ICCAD'22 - IEEE/ACM Int'l Conference on Computer-Aided Design

Hybrid in-person and virtual conference

Deadline: May 23, 2022 (Abstracts due: May 16, 2022)

Oct 30 - Nov 3, 2022

<http://www.iccad.com>

### BioCAS'22 - Biomedical Circuits and Systems Conference

Taipei, Taiwan

Deadline: June 10, 2022

Oct 13-15, 2022

<https://2022.ieee-biocas.org/>

### HiPC'22 - IEEE Int'l Conference on High Performance Computing, Data, And Analytics

Deadline: June 24, 2022

(Abstracts due: June 10, 2022)

Dec 18-21, 2022

<http://www.hipc.org>

## Upcoming Conferences

### ISSCC'22 - IEEE Int'l Solid-State Circuits Conference

San Francisco, CA

Feb 20-24, 2022

<http://isscc.org>

### VLSID'22 - International Conference on VLSI Design &

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# Job Openings

## 1. University of Paderborn

**Job Title:** Full Professor in Department of Electrical Engineering and Information Technology

**Description:** The faculty is seeking a highly qualified candidate with scientific expertise proven by peer reviewed publications who can fully represent the respective field in teaching and research and has demonstrated particular scientific competence in one or several of the following subject areas: Modelling, process monitoring, and control of electrical drives; Design and manufacturing of electrical machines (including integration of power electronics and sensors); Integration of electrical drives into mechatronic, energy, or electro-mobile applications. Applications with the usual documents must be submitted by 15.02.2022 (including reference number 5018) via email to [bewerbungen@ei.uni-paderborn.de](mailto:bewerbungen@ei.uni-paderborn.de). All documents must be compiled into one single PDF file. Information regarding the processing of your person data can be located at: <https://www.unipaderborn.de/zv/personaldatenschutz>.

## 2. Shandong University China

**Job Title:** Faculty Members in Theoretical and Computational Sciences

**Description:** Qingdao Institute for Theoretical and Computational Sciences (QiTCS; <http://www.qitcs.qd.sdu.edu.cn/>) is a newly founded research institute associated to Shandong University at Qingdao campus. QiTCS focuses on theories, methods, algorithms, software and applications in theoretical and computational chemistry, biophysics, materials, condensed matter and numerical mathematics. In each of the 5 directions there will be 2 to 3 principle investigators, each of whom may lead a group of 2 to 3 faculty members (full, associate or assistant professors), totaling up to 40 faculty members. Personnels who are skilled at software development are especially welcome.

## 3. University of Washington United States

**Job Title:** Assistant Professor Without Tenure in Clinical Informatics

### International Conference on Embedded Systems

Virtual Conference

Feb 19-23, 2022

<http://embeddedandvlsidesignconference.org/>

### FPGA'22 – ACM/SIGDA Int'l Symposium on Field-Programmable Gate Arrays

Monterey, CA

Feb 27 - Mar 1, 2022

<http://www.isfpga.org>

### DATE'22 - Design Automation and Test in Europe

Antwerp, Belgium, and online

Mar 14-23, 2022

<http://www.date-conference.com>

### ISPD'22 – ACM Int'l Symposium on Physical Design

Banff, Alberta, Canada

Mar 27 - 30, 2022

<http://www.ispd.cc>

### ISQED'22 - Int'l Symposium on Quality Electronic Design

California

April 6-8, 2022

<http://www.isqed.org>

### RTAS'22 - IEEE Real-Time and Embedded Technology and Applications Symposium

Milano, Italy

May 4-6, 2022

<http://2022.rtas.org>

### FCCM' 22 - IEEE International Symposium On Field-Programmable Custom Computing Machines

New York

May 15–18, 2022

<https://www.fccm.org/>

### ISCAS'22 – IEEE Int'l

### Symposium on Circuits and Systems

Austin, TX

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**Description:** The Department of Biomedical Informatics and Medical Education (BIME) at the University of Washington (UW) is looking for one full-time faculty at the Assistant Professor Without Tenure (Job Code 10113) level to join our current faculty in growing an ACGME-accredited clinical informatics fellowship program which started enrolling fellows in July 2016 and has achieved steady-state enrollment of four fellows. This is a full-time, 12-month appointment with an anticipated start date in Summer 2022. All University of Washington faculty engage in teaching, research, and service. This position will work closely with the Director of the Clinical Informatics Fellowship. Responsibilities include: a) expanding our basic and applied biomedical informatics research program (approximately 40% effort), b) serving as core faculty in the clinical informatics fellowship program (approximately 20% effort), c) working within UW Medicine Information Technology (ITS, e.g. clinical computing) on operational clinical informatics projects within the health system (approximately 20% effort), d) clinical practice (approximately 20%). Successful candidates will be appointed to the appropriate clinical department, such as Medicine, Surgery, Family Medicine, or Pediatrics, with a joint appointment in BIME. The position is part of a broader effort in BIME which includes recruitment of faculty in the areas of Analytics, Clinical Informatics, Clinical Research Informatics, and Genomic Medicine/Translational Bioinformatics. For help signing up, accessing your account, or submitting your application, please check out Interfolio's help and support section or get in touch via email at [help@interfolio.com](mailto:help@interfolio.com) or phone at (877)997-8807.

May 28 - June 1, 2022  
<http://iscas2022.org>

**GLSVLSI'22 – ACM Great Lakes Symposium on VLSI**  
Orange County, CA  
June 6-8, 2022  
<http://www.glsvlsi.org>

**ISCA'22 – Int'l Symposium on Computer Architecture**  
New York City, USA  
June 11-15, 2022  
<https://iscaconf.org/isca2022/>

**HiPEAC'22: Int'l Conference on High Performance Embedded Architectures & Compilers**  
Budapest, Hungary  
June 20-22, 2022  
<https://www.hipeac.net/2022/budapest/>

**HOST'22 – IEEE Int'l Symposium on Hardware-Oriented Security and Trust**  
Washington DC  
Deadline: May 11, 2021 (Abstracts due: Apr 27, 2021)  
June 27-30, 2022  
<http://www.hostsymposium.org>

**DAC'22 – Design Automation Conference**  
San Francisco, CA  
July 10-14, 2022  
<http://www.dac.com/>

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