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Looking Back, Looking Forward: Reflections of an Editor in Chief

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THIS IS MY last issue as the Editor in Chief (EIC) of *IEEE Software*, a role I have held since January 2019 as the 10th EIC of the magazine. It has now become an unspoken tradition that in the last editorial the EIC summarizes a reflection of their tenure.

During my five-year tenure, there have been many moments when I took mental notes of the nuggets I might consider sharing the day when I reached this milestone of writing my last editorial. Many of these may not appear as pertinent to you, the readers, now that I am composing this last editorial. I sure hope that if you are reading this article, you already know that as a magazine with a focus on software engineering (SE), *IEEE Software* has established a stellar reputation of relevance and quality. A magazine format is somewhat unconventional for both academic professionals in SE, who typically favor peer-reviewed, in-depth scientific articles, and hands-on software engineers, who may prefer easily

accessible current technology focused educational content like blogs or videos. *IEEE Software* manages to stay competitive and afloat in both realms. I also sure hope you know that the magazine continues to do well in terms of all of the metrics, such as impact factor and ranking among its peers. Gaining thousands of more followers in our social media accounts to better engage with the broader SE community would not be bad either, but alas, something had to give during my tenure. So I will not bore you all with these obvious reflections.

Despite a global pandemic, the magazine managed to stay ahead these past five years. This is not only an outcome of my tenure, but it is a reflection of the dedication of the board and the very solid foundation that my predecessors built. I stood on their shoulders. My successor, Dr. Sigrid Eldh, is coming directly from industry, and her experience and skills are exactly what the magazine needs at this time in its evolution (see "Passing the Baton to Sigrid Eldh").

As I conclude my tenure as the EIC of *IEEE Software*, my final editorial provides an opportunity to contemplate the evolving challenges and successes across the terms of my predecessors as well as my own reflections. By delving into the past, including my term of service, I aim to offer insights into the future.

Some Things Never Change

IEEE Software turned on its lights in 1984. The first EIC of *IEEE Software* was Bruce D. Shriver (1984–1987). Shriver,[1] in the very first issue of the magazine, introduced *IEEE Software* with the following words: "The Editorial Board of *IEEE Software* has the ambitious goal of making this publication one of the preeminent magazines for software practitioners—a periodical that these professionals will read to help them understand software and software-related issues." This goal throughout the past 40 years only became stronger for the magazine. Unfortunately, these 40 years also witnessed an ever-increasing gap between the research and practice of software as several EICs noted.[2]

I drew attention to the need to close the gap by emphasizing that

we all need to be software engineers before we identify as academics or practitioners.[3]

Shriver, as he was turning over the leadership of the magazine to Ted Lewis, reflected on the quality and the number of reviews that the magazine was able to accomplish during his tenure to accomplish the vision of the magazine.[4] Quality and timely review is a top priority for the magazine, but I cannot deny the increasing challenge we are all facing in finding reviewers and providing high-quality and timely reviews.[5]

Ted Lewis (1987–1990) in his closing message—mind you, 33 years ago—called attention to the growth in the number of subscribers and number of pages allocated to the magazine.[5] I could not help but chuckle at Lewis' reference to the yearly page budget. During those years, it apparently was at 612. Well, it stayed there for a very very long time; many of my predecessors fought for more pages with the IEEE Computer Society because we have had so much to say.

More pages mean more timely content delivered more quickly to the readers. It also means more effort on editing, curating, and coming up with coherent issues. It is a delicate balance. During my tenure, our page budget increased to 808. I do not celebrate this as my success but as an example of "if you keep at it, one day someone will hear you, if it is an important enough concern."

On other aspects of growth, ironically, I called out social media following in addition to the importance of subscribers. How we consume content has changed and will continue to change. Growth has been and will continue to be of importance for *IEEE Software* because anyone who touches any aspect of producing each issue is incredibly proud of the outcome and would like to share and debate the content with the broader software engineering community.

We strive hard to not be a write-only outlet. Lewis[6] puts it well: "I believe *IEEE Software* is successful because we have positioned ourselves between pure research and pure practice." Lewis compared the magazine to other similar ones at the time, such as *Dr. Dobbs*, *Computer Language*, and *Byte*—none of which exist today! A publication that has the support of a professional society can have a lot of challenges due to procedures and out-of-date technologies, but the labor of love of volunteerism and dedication to improving a profession cannot be beaten by any endeavor with a financial interest.

Carl Chang (1990–1994), in fact, precisely emphasized the critical importance of teamwork.[7] The magazine works well due to all of those who give their time without many expectations in return. In addition, when you put forward content that focuses on enduring SE principles, a top priority goal of this magazine, it weathers the test of time, even when we feature emerging technologies.

Alan Davis (1995–1998), the fourth EIC of the magazine, had the most pessimistic take on the state of the software industry; he, too, expressed his frustrations at the disconnect between the practice of SE and academia. Many of the issues he calls out still persist today, for example, the lack of disciplined design and architecting. Davis[2] goes as far as saying, "The lack of a design discipline in software engineering has made us the laughingstock of other engineering disciplines." He sees books such as *Software Architecture* by Shaw and Garlan[8] and *Design Patterns* by Gamma et al.[9] as

positive signs that the problems he was seeing would go away in a decade. There have been many other books published since the mid-1990s, and progress has definitely been made. Yet, I do not think that we have accomplished "beauty" and "elegance" in software architecture, let alone the concept of the interplay between form and function, and between beauty and utility as Davis longed for at the time.

An illustrative example highlighting the oversight of the significance of architecture and design is how the enthusiasm for generative AI tools fails to recognize that real-world systems frequently involve millions of lines of structured code with intricate behaviors, rather than simply generating a few classes and methods.[10] Design and architecture has been among the top interest areas of both our authors and our readers. We continue to do our part to feature experiences from the field and progress in bringing designing and architecture discipline in software engineering, but there is still a lot of good work to be done.

Steve McConnell's term from 1999 to 2002 coincided with the iconic Y2K scare as well as the boom in software development activity, such as the rise in web development and open source software, the release of the first version of the Software Engineering Body of Knowledge (SWEBOK), and the release of the IEEE Computer Society and Association for Computing Machinery Software Engineering Code of Ethics and Professional Practice.[11] During my tenure, I paid special attention to shining a light on ethics and related issues.[12] This focus was not only driven by the explosion of AI advances and countless concerns around their creation and use but also fueled by all of the societal concerns we have collectively observed: the COVID-19 pandemic, the shift of how we work in a hybrid environment, and the diversity and inclusion battles.[13] *Software* had and will continue to have a special role in all of these societal shifts and ethics matters.

During our annual board meetings, when we discussed theme issues, we all got excited about featuring SE and ethics in each year of my tenure, but we were never able to materialize a special issue around the topic. As the board, we were all committed to drawing attention to ethics beyond AI. During my term as the EIC, we were not able to curate a theme issue focused on SE and ethics, but we did not give up.

I am very excited to introduce the "Software Engineering and Ethics" column[A2] in this issue of the magazine. The column will be co-edited by Brittany Johnson and Tim Menzies (see "New Departments and Department Editors"). In fact, if I am to be remembered by one contribution, it can be elevating the critical importance of ethics in SE with this column. Responsible engineering is not only an AI concern; it is an individual responsibility of any software engineer, and it is a collective responsibility of any team and organization. We have to raise the bar!

Warren Harrison (2003–2006) did also draw attention to the importance of volunteerism and how collective ownership and giving your own time to something bigger than your day job or career is what propels publications like *IEEE Software*.[14] Volunteerism has been a theme that all of the subsequent

PASSING THE BATON TO SIGRID ELDH

Sigrid Eldh is a senior specialist and researcher at Ericsson, leading Ericsson's research in the area of SE, testing, and product quality, including fault-related activities. She has been at Ericsson for 29 years and has 35+ years of knowledge of the software industry, government, and academia. She also serves as a senior lecturer at Mälardalen University where she took her Ph.D. "On Test Design" and serves as an Adjunct Professor at Carleton University. Sigrid focuses on bridging the gap between industry and academic research. She has initiated and built practitioners testing organizations such as International Software Testing Qualifications Board (ISTQB) and Swedish Association of Software Test (SAST). She contributes academic reviews; she chairs and organizes large conferences and leads large collaborative research projects.

EICs focused on. Hakan Erdogmus (2007–2010) made a call to the readers to stay involved.[15] Forrest Shull (2011–2014) reviewed the many moving parts of the magazine and how they all fit together to define the magazine, yet none of it would have worked without the board, the authors, and the readers.[16] Diomidis Spinellis (2015–2018) explained the difficult task of narrowing down the 310 applications the magazine received after an open call of volunteers.[17] That level of interest is what makes *IEEE Software* work as the unique publication that it is in SE. While the EIC becomes the face of the magazine, there is an army behind them.

Looking Back, Looking Forward

A historic review of the previous nine EICs' perspectives clearly shows that some of the issues we cared about had commonality: volunteerism, making progress on the enduring technical challenges of our profession, featuring timely content, closing the academia and practitioner gaps, focusing on quality, and staying ahead of the changing nature of publication outlets. These topics will continue to be among the day-to-day concerns of my successors.

We are seeing an ever so increased pace of change in technology and a race to keep up. Our content's purpose in *IEEE Software* has been and will continue to center on timeless principles to "build the community of leading practitioners," regardless of whether they are based in academia, startups, defense industries, governments, or global industry organizations. Sigrid Eldh, our eleventh EIC, brings a unique combination of industry, education, and research experience. Her expertise will be invaluable.

The IEEE Computer Society implements a rotation system for all of its roles. There are countless benefits to this policy. A fresh perspective is essential for improvement and growth. A rotation-based

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system also contributes to growing a healthy professional community. The board members over the years have become my professional family, some of whom I call good

FIGURE 1. Themes featured in issues from 2019 to 2023.

friends. The pandemic taught us that if we really want to engage, everyone is a click away. The camaraderie, the technical debate, the honest feedback, and the enthusiasm toward the goal of making your profession better are a combination of characteristics unique to the *IEEE Software* board.

Putting together each issue of *IEEE Software* is not an operation that is focused solely on article processing. Each issue is curated with a

NEW DEPARTMENTS AND DEPARTMENT EDITORS

With this November/December 2023 issue, we are introducing two new departments, "Adventures in Code,"[A1] by Diomidis Spinellis, and "Software Engineering and Ethics,"[A2] coedited by Brittany Johnson and Tim Menzies. In addition, Laura Maguire will be joining our board as the new department editor for our "Failure Mode" column.[A3]

Diomidis Spinellis and Tim Menzies are not foreign to the magazine; both have served the magazine for many years. We are excited to welcome Brittany and Laura as well, who both bring fresh perspectives to enduring issues. Do not hesitate to reach out to any of them if you have relevant experiences and have articles to contribute.

Dr. Brittany Johnson-Matthews is an assistant professor in the Department of Computer Science at George Mason University. She received her Ph.D. in computer science from North Carolina State University. She explores sociotechnical problems pertaining to developer productivity and software development/use, such as tool support, work environments, ethics, and software for social good. Her research is interdisciplinary, cross-cutting with research in SE, human–computer interaction, and machine learning.
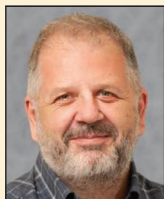
Dr. Tim Menzies is a professor of computer science at North Carolina State University (USA). He's the director of the Real-World AI for SE (RAISE) Lab, which explores SE, data mining, AI, search-based SE, and open-access science. He's the author of more than 250 publications and editor of three books summarizing the state of the art in software analytics. From 2002 to 2004, he was the SE research chair at NASA's Independent Verification and Validation Facility. Menzies is the cofounder of the PROMISE conference series, devoted to reproducible experiments in SE. He was previously the editor of the "Redirections" and "Software Engineering and AI" departments. For more, see http://menzies.us/.

Dr. Diomidis Spinellis is a professor in the Department of Management Science and Technology at the Athens University of Economics and Business (Greece). From 2009 to 2011, he served as the secretary general for information systems at the Greek Ministry of Finance, while in 2013, he worked as a site reliability engineering senior software engineer for Google. He was the EIC of *IEEE Software* from 2014 to 2018. He is the author of two award-winning books, *Code Reading* and *Code Quality: The Open Source Perspective*, as well as more than 200 widely cited scientific articles. He holds an M.Eng. in SE and a Ph.D. in computer science, both from Imperial College London. Spinellis is a Senior Member of IEEE and the ACM. For more information, visit www.dmst.aueb.gr/dds. Contact him at dds@computer.org.

Dr. Laura Maguire is a cognitive systems engineer and researcher who works with software organizations on human–machine teaming and the design of software for complex and cognitively demanding work. She is a Fellow with the Cognitive Systems Engineering Lab at The Ohio State University. She can be reached at maguire.81@osu.edu.

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well-thought-out balance of article selections from theme issues, column editors, feature articles, and Software Engineering Radio (Figure 1). For anyone reading this article, my biggest advice is that if you ever find a community such as *IEEE Software*, just hold onto it as you cannot begin to anticipate the ways it will help you grow, both as a person and as a software engineer.

If you have not found your community yet, maybe we can be it. Join our ranks! Don't be intimidated by the high bar and the competitiveness. We have many roles, and we mentor those who are willing to contribute and stay engaged.

And if you have made it this far in reading this column, first of all, thank you! Thank you for reading the editorials and the articles, and thank you for taking the time to send your reflections to me. I learned a lot from the readers. Most important, I learned the kind act of caring, enough to reach out and share one's thoughts, sometimes to agree and thank, and other times to disagree and to debate a different angle. Those messages showed me the difference *IEEE Software* makes.

There are countless numbers of people to thank, and there is no way I can be comprehensive. IEEE and the IEEE Computer Society staff work tirelessly. Our board works tirelessly. My colleagues and leadership at the Carnegie Mellon University Software Engineering Institute have been incredibly supportive, solid sounding boards, and the biggest cheerleaders of the magazine and the role of EIC that I held. But I will single out one person, Jessica Welsh. Jessica was the IEEE editor for *IEEE Software* starting with my tenure in January 2019 until January 2023, when she left IEEE to join another organization. No matter what went on, the issues came together, and they came together well and timely because Jessica kept things moving, edited the articles well, and stayed on top of all the moving parts. If I have been effective at all, a large part of it is thanks to her diligent attention to detail and encouragement when I started slipping schedules or dropping the balls.

Today, the world runs on software. This will only accelerate. Publications like *IEEE Software* play a critical role in establishing and spreading a rigorous engineering discipline to create high-quality systems. Share relentlessly your experiences and the message about the importance of excellence, rigor, diverse perspectives, ethics, and discipline in SE! Spread the word and be loud! 𝕊𝕨

Appendix: Related Articles

A1. D. Spinellis, "Commands as AI conversations," *IEEE Softw.*, vol. 40, no. 6, pp. 22–26, Nov./Dec. 2023, doi: 10.1109/MS.2023.3307170.

A2. B. Johnson and T. Menzies, "Unfairness is everywhere, so what to do? An interview with Jeanna Matthews," *IEEE Softw.*, vol. 40, no. 6, pp. 135–138, Nov./Dec. 2023, doi: 10.1109/MS.2023.3305722.

A3. L. Maguire, "Cognitive skills in software engineering: Operating complex, adaptive systems at speed and scale," *IEEE Softw.*, vol. 40, no. 6, pp. 130–134, Nov./Dec. 2023, doi: 10.1109/MS.2023.3313789.

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2. A. M. Davis, "Predictions and farewells [From the Editor]," *IEEE Softw.*, vol. 15, no. 4, pp. 6–9, Jul./Aug. 1998, doi: 10.1109/MS.1998.687936.

3. B. Shriver, "Logging off," *IEEE Softw.*, vol. 4, no. 2, p. 3, Mar. 1987.

4. I. Ozkaya, "Crossing the great divide of software engineering," *IEEE Softw.*, vol. 39, no. 4, pp. 4–7, Jul./Aug. 2022, doi: 10.1109/MS.2022.3161770.

5. I. Ozkaya, "Protecting the health and longevity of the peer-review process in the software engineering community," *IEEE Softw.*, vol. 38, no. 1, pp. 3–6, Jan./Feb. 2021, doi: 10.1109/MS.2020.3028681.

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8. M. Shaw and D. Garlan, *Software Architecture: Perspectives on an Emerging Discipline*. Upper Saddle River, NJ, USA: Pearson, 1996.

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10. I. Ozkaya, "Can architecture knowledge guide software development with generative AI?" *IEEE Softw.*, vol. 40, no. 5, pp. 4–8, Sep./Oct. 2023.

11. S. McConnell, "Changing of the Guard," *IEEE Softw.*, vol. 19, no. 6, pp. 5–7, Nov./Dec. 2002, doi: 10.1109/MS.2002.10025.

12. I. Ozkaya, "Ethics is a software design concern," *IEEE Softw.*, vol. 36, no. 3, pp. 4–8, May/Jun. 2019, doi: 10.1109/MS.2019.2902592.

13. I. Ozkaya, "Mom, where are the girls?" *IEEE Softw.*, vol. 38, no. 2, pp. 3–6, Mar./Apr. 2021, doi: 10.1109/MS.2020.3044410.

14. W. Harrison, "Giving back," *IEEE Softw.*, vol. 23, no. 6, pp. 5–7, Nov./Dec. 2006, doi: 10.1109/MS.2006.161.

15. H. Erdogmus, "Passing the reins," *IEEE Softw.*, vol. 27, no. 6, pp. 3–5, Nov./Dec. 2010, doi: 10.1109/MS.2010.144.

16. F. Shull, "Passing the baton," *IEEE Softw.*, vol. 31, no. 6, pp. 4–8, Nov./Dec. 2014, doi: 10.1109/MS.2014.143.

17. D. Spinellis, "The editor's retrospective," *IEEE Softw.*, vol. 35, no. 6, pp. 4–7, Nov./Dec. 2018, doi: 10.1109/MS.2018.4321238.