IEEE Fellow Processes – Update

Presentation to IEEE Computer Society Standards Activities Board

https://www.computer.org/volunteering/boards-and-committees/standards-activities/home

Joe Hughes

Vice-Chair, IEEE Fellow Committee

September 3, 2024

IEEE
Advancing Technology for Humanity

ieee.org/fellows

IEEE Fellow Committee 2024

Leadership & Points of Contact

- Chair: Isabel Trancoso, IST / INESC-ID, University of Lisbon (Retired)
- Vice-Chair: Joe Hughes, Georgia Tech (Retired)
- Managing Director, MGA: Cecelia Jankowski
- IEEE Fellow Activities: Jennifer Guida, Lisa Weisser, Matthew Plotner
- **Email: fellows@ieee.org**

Volunteer Committee Members

- ~500 Members of S/C FECs and CFECs
- 50 Fellow Committee members appointed by the BoD

Outline

- Introduction to the IEEE Fellows Program
  - Recent Fellow Program Improvements
  - The Overall Fellow Evaluation Process
  - Society/Council and Fellow Committee Roles
- Contribution Categories and Standards Activity
  - Standards Contributor, other standards activity
  - Evaluating contributions
- Resources to Support the Fellow Process
  - IEEE Fellow website
  - Contribution Characterization Matrix, Contribution Example Matrix
  - IEEE Standards Association website
- Possible Opportunities for CSSAB
- Questions & Discussion

Fellow Grade Qualification

Focusing on significant value to society at large

- **IEEE Bylaw I-104.(2)**
  - The grade of Fellow recognizes unusual distinction in the profession and shall be conferred by the Board of Directors upon a person with an outstanding record of accomplishments in any of the IEEE fields of interest
    - Engineering; Computer sciences and information technology; Biological and medical sciences; Mathematics; Physical sciences; Technical communications, education, management, law and policy.
  - The accomplishments that are being honored shall have contributed importantly to the advancement or application of engineering, science and technology, bringing the realization of significant value to society

- **IEEE Fellow Committee Operations Manual further specifies:**
  - 5 Contribution Categories for (contributions of) Nominees:
    - Research Engineer/Scientist (RE/S), Technology Innovator (TI), Technical Leader (TL), Educator (EDU), and Standards Contributor (STDC)
    - Chosen by the nominator, but can be changed by the S/C-FEC or Fellow Committee
    - The one or two identified contributions may be in the same or **different** categories

The IEEE Fellow Committee

From the IEEE Fellow Committee Operations Manual:

- The IEEE Fellow Committee (FC) shall be responsible for making recommendations to the IEEE Board of Directors (BoD) for Nominees to be conferred the grade of Fellow. The IEEE FC shall also provide a citation for each such Nominee. The IEEE FC shall review nomination applications with the goal of recommending to the IEEE BoD individuals who have demonstrated technical excellence and the highest standards of professional ethics and scientific integrity.

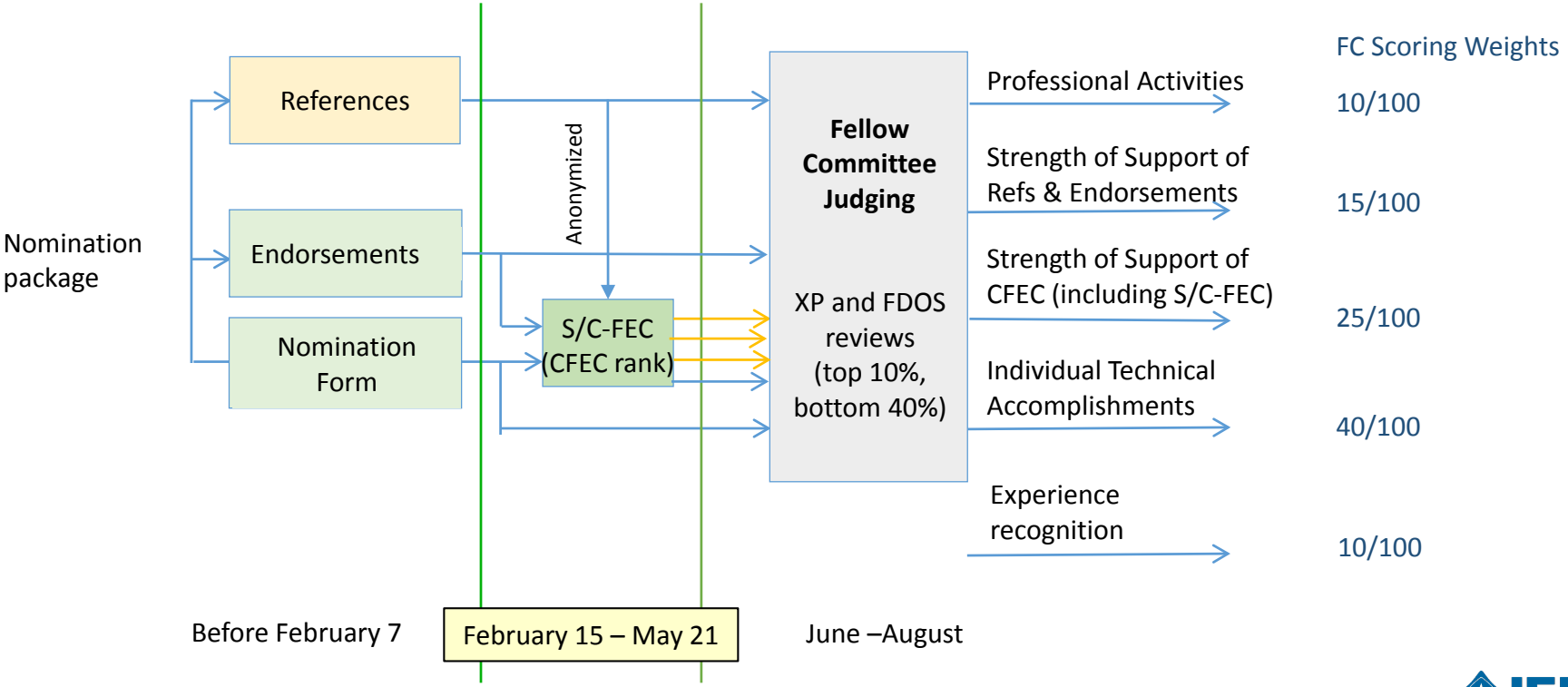
Fellow Committee Diversity Statement – Adopted in 2020

- The IEEE Fellow Program recognizes exceptional contributions to all IEEE fields of interest made by individuals regardless of race, gender, age, religion, national origin, or other personal characteristics not related to ability, performance, or qualifications. The IEEE Fellow Program is committed to pursuing diversity in all its operations to help realize and maintain fair nomination and selection processes without bias or discrimination.

Recent Fellow Program Improvements

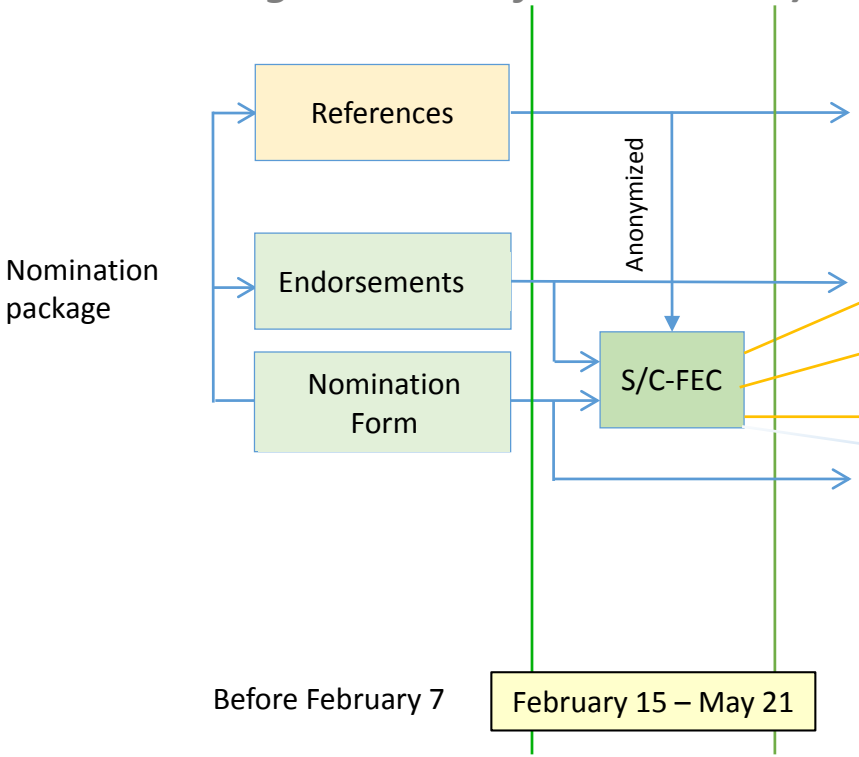
- In fall 2022, after a three-year ad hoc committee review, the IEEE Board of Directors approved 16 recommendations for Fellow program improvement
- Intended to enhance the Fellow program's technical diversity and DE&I
  - Maintaining two-level evaluation process for program's integrity and diversity
  - Striving for fairness to each and every single nominee
  - Contributions categorized separately, not whole nomination
  - Standards Contributor added as a new Contribution Category
  - Balancing the needs of large/small Societies/Councils, particularly the disparity in nomination pool sizes (from 0 to 150)
  - Bringing the decision-making process closer to where the actions are – S/C levels through the implementation of Cohort Fellow Evaluation Committees (CFECs)
- Some changes were implemented in 2023, most are now in place

The Overall Fellow Evaluation Process



S/C-FEC Evaluation and Scoring (single-society cohort)

(medium or large number of nominations)



Step 1: Five evaluators (including 2 specialists, 2 generalists) individually review and score each nomination.

	Weight
Professional Activities	10/100
Strength of Support of Refs & Endorsements	15/100
Individual Technical Accomplishments	75/100
Narrative	

Step 2: As group, S/C-FEC discusses nominations; finalizes scores & rank.

S/Cs and Fellow Committee: Different Roles in One Process …

2-level evaluation process has proven to be effective

- S/C Fellow Evaluating Committee (S/C-FEC)
  - Provide IEEE Judges with a *critical evaluation and an assessment* of the degree of qualification of its Nominees, based on nomination, references and endorsement forms
  - The evaluation shall be primarily a *technical assessment*
  - Does not recommend Nominees for elevation, as they only see the Nominees referred to their own S/C
- Cohort Fellow Evaluating Committee (CFEC)
  - Provide a consolidated ranking of nominations from multiple smaller S/C-FECs in the same Division
- IEEE Fellow Committee
  - Evaluate all nominees *across all IEEE fields of interest and all S/Cs* using:
    - Nomination Form, Endorsements, and References
    - S/C-FEC and CFEC evaluation forms (narrative, score, rank)
    - Judges must do their own due diligence
    - Judges do NOT represent their Societies, they represent the IEEE
  - *Recommend* to the IEEE BoD a list of Nominees for elevation to the IEEE Fellow grade

… But Same Evaluation Criteria/Principles

- Nominees must have *verifiable evidence* of (a) specific and outstanding individual technical contributions and (b) their impact on technology, science, and society
  - Elevation is for specific 1-2 impactful contributions, not for a body of work
- Impact must be *already* evident, not potential
- Contributions in the application of engineering, science, and technology shall be accorded equal recognition with theoretical developments
- Significance of contributions and evidence to consider depends on the contribution categories (EDU, RE/S, TI, TL and STDC), not on affiliation type (Industry, Academia, Govt, or others)
  - Example: A STDC contribution from a nominee in Government or Academia, shall be assessed using the same expectations for evidence as a STDC contribution from an industry nominee

Contribution Categories and Standards Activities

- **Evaluation of a Fellow nomination is based primarily on one or two specific technical or educational contributions, not lifetime achievements**
- **One of five Contribution Categories must be specified for each contribution:**
  - Educator (E)
  - Research Engineer/Scientist (RE/S)
  - Standards Contributor (STDC) – *added for 2024 Fellow Class*
  - Technology Innovator (TI) – *formerly Application Engineer/Practitioner*
  - Technical Leader (TL)

  ➢ Contribution Category chosen by nominator; S/C-FEC or FC Judge can recommend a change
- **Choice of Contribution Category affects expectations and evidence for evaluation**

Standards Contributor (STDC)

New Contribution Category added for Fellow Class of 2024

- STDC contributions may (a) define the framework, reference, functional or design architectures for a standard or family of standards, OR (b) demonstrate strong technical skill in leading a standards project or task or in building technical consensus
- STDC directly or indirectly provides original technical content to a standard project, which ultimately is adopted into the published standard or widely accepted specifications
- Evidence of the **type** of contribution may come from the IEEE SA Contributor Collection, Internet Engineering Task Force's (IETF's) RFC, and/or other Standards Development Organizations' or alliances' publications certifying individual contributions, or working group meeting minutes
- Evidence of **impact** of the contribution may include role in development of the standard, as shown by reference and endorser testimony, related publications and patent activity, IEEE or other awards with citations to the standard; and broader impact of the standard, including functional, scientific, economic, market and societal aspects
  - Quality and quantity of scholarly publications are not meaningful for a STDC and lack thereof must not penalize Nominee
- Class of 2024: 13 nominations include STDC contributions

Technology Innovator (TI)

Standards work may be included in other Contribution Categories

- TI may make significant technical contributions to the design and/or evolution into manufacturing of products or systems, the use, operation, or application of such products or systems, and the advancement of industry practices and standards (IEEE or not)
- Find clear and convincing evidence that such contributions are the direct result of the Nominee's personal effort and that the contributions have had impact on industry, the profession, or society at large.
- Look for innovation, creativity, importance of the contribution, impact on industry, the profession or society at large, and documentation of the specific technical contributions
- There should be a clear evidence of specific technical contributions: documented contributions to industry practices and standards, patents, reports, endorsements, articles, recognitions provided by experts in the community and beyond the Nominee's institution
  - Quality and quantity of scholarly publications are not meaningful for a TI and lack thereof must not penalize Nominee

Evaluation Principles and Tasks (1/2)

➔ ***APPLY TO ALL CONTRIBUTION CATEGORIES*** ➔

- **Evaluation principles (common to S/C-FECs, CFECs, and IEEE FC):**
  - The contributions by technologists in the application of engineering, science, and technology shall be accorded **equal recognition with theoretical developments**
  - The Nominee must have made **substantial** individual technical **contributions**
  - The **impact** of the Nominee **must have already happened**, and there should be no speculation on potential future impact
- **Impact on standardization can be achieved in many ways**
  - A technical leader who submitted influential contributions, led technical discussions, and drove the Working Group to consensus; a researcher that wrote an influential paper containing findings that were adopted in a popular standard; a practitioner whose forward-looking patents became later essential to popular standards.
  - "Standards Contributor" may be selected as the category to characterize a contribution. However, standards activity may provide evidence of impact for contributions in any category.

Evaluation Principles and Tasks (2/2)

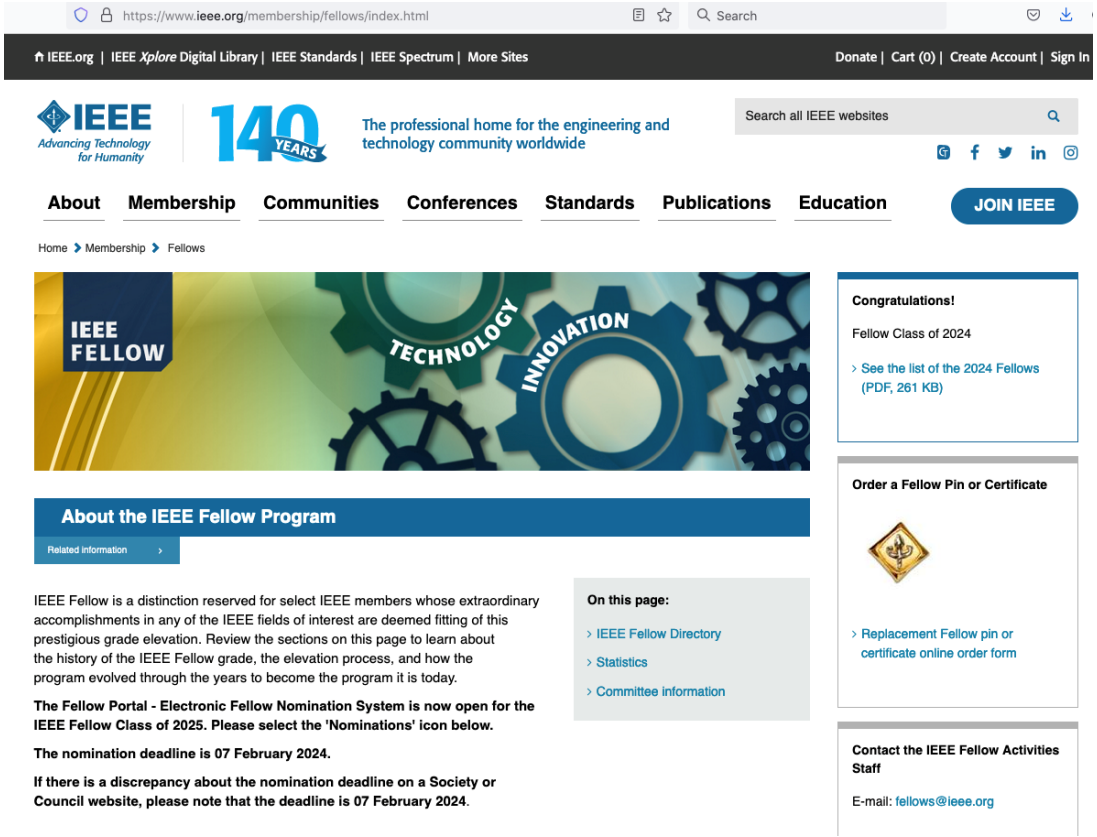
➔ ***APPLY TO ALL CONTRIBUTION CATEGORIES*** ➔

- **Evaluator and Judge tasks (common to S/C-FECs, CFECs, and IEEE FC):**
  - Identify specific **outstanding technical accomplishments**, as Fellow elevation is bestowed for **one or two specific contribution** and **not for a body of work**
  - Critically assess the **innovation, creativity, importance, impact and degree of acceptance** of the contribution(s)
  - Critically assess the Nominee's individual **role in the contribution(s)**
  - Critically verify the **evidence** provided, doing your own due diligence on the basis of publicly available information
  - Critically compare **impact of contribution(s)** to that of other Nominees
- **Endorsements:**
  - Useful when no other *verifiable* evidence of impact exists.
  - Most effective when from company officers, Government program directors, representatives of standards bodies, or colleagues who are in a position to verify nominator's claims on impact and individual role of Nominee

Individual Contributions/Technical Accomplishments Scoring

- Consider **technical contributions only**, and assess impact and role – not service to IEEE, which has its own category.
  - Design and evolution into manufacturing of products or systems, the use, operation or application of such products or systems.
  - Advancement of industry practices and standards.
  - Peer-reviewed publications, books, and patents.
  - Technical leadership in outstanding application oriented or scientific accomplishments
- Consider the **verifiable evidence** of Nominee's contributions and **impact** in the context of the specific nomination category (e.g., publications important for RE/S but not for TI or TL).
- Use information and *evidence* from all sources:
  - Nomination
  - Society evaluation
  - References
  - Any optional Endorsements
- This is YOUR opinion of the Nominee's contributions that raises him/her significantly above the norm.

Resource: Fellow Website (1)



Resource: Fellow Website (2)

IEEE Fellow Directory

Access the directory

Note: If a member is "active," a Fellow or Life Fellow, and they want their name to appear in the Fellow Directory, they must have "opted in" when they renewed. If unsure, the member can update his/her profile by going to https://www.ieee.org/membership/renew.html, scrolling down to "Additional Resources," and clicking on "update your member profile."

TOP OF PAGE

Statistics

- Fellow Statistics - Employment Affiliation (PDF, 38 KB)
- Fellow Statistics - Regional Affiliation (PDF, 63 KB)
- Fellow Statistics - Summary Year (PDF, 13 KB)
- Fellow Statistics - Women Elevated (PDF, 31 KB)

IEEE-USA Government Fellowships

Learn more about IEEE-USA Government Fellowships

IEEE Fellow News

IEEE Fellow (2009) Chai K Toh has been elected to International Fellow of The Royal Academy of Engineering UK. Learn more.

Updated Resources for the Fellow Process

The following documents can be found on the Fellow Website at www.ieee/fellows

IEEE Fellow Guidelines

Governance

>IEEE Bylaws (PDF, 2 MB)

>Fellow Committee Operations Manual (Effective November 2023) - (PDF, 708 KB)

User Guides

>Nomination Quick Help Guide

>Sample Nomination Form

>Reference Quick Help Guide

>Sample Reference Form

>Endorsement Quick Help Guide

>Sample Endorsement Form

>IEEE Fellow Contribution Categories Matrix - **NEW**

Operational Guides

Fellow Committee Handbook - **Updates Pending**

Society/Council Fellow Evaluating Committee Handbook - **Updates Pending**

FC documents have been updated or are being updated. In the meantime, the generic information are still useful for us to read

Resource: Contribution Characterization Matrix (1)

A small portion of the full matrix, available on Fellow website

	Evidence Domains				
	Research Publications	**Peer-Reviewed Materials**	**Designs, Products, Processes, Algorithms, Systems, and Public/Industrial Contributions**	**Patents/Trade Secrets**	**Standards**
Generic Definition/ Examples	**Scholarly cited articles, refereed papers in archival journals (not survey papers), edited or authored books, papers in technical reports or other refereed publications.**	**Tutorials, survey papers, position papers, white papers, articles in popular press, internal reports, books about practice in the field, design review packages, and other documents describing the development/ application of products, systems, facilities, services, or software.**	**Contributions that demonstrate development of industrial/public systems, deployments, and innovations. Examples include building and habitation, space, utilities infrastructure, social networking, telecommunications, devices, solid state technologies.**	**Any type of document or legal arrangement protecting Intellectual Property.**	**Contributions that 1) define the framework, reference, functional or design architectures for a standard or family of standards, 2) demonstrate strong technical skills in leading a standards project or task, 3) demonstrate direct or indirect original technical content in a standard project that is adopted into a published standard or widely accepted specifications.**
TI	**Contributions in this Category commonly do not have evidence from this Domain.**	**Contributions in this Category may be supported by evidence from this Domain, but such evidence is not normally expected. Significance-impact should NOT be penalized by the absence of evidence from this Domain.**	**Contributions in this Category normally have significant evidence from this Domain.** - Individual role of the nominee in the team/initiative (if any) - Technical contribution or innovation, risk involved, performance improvement, economic results, or other advantages - Level of adoption of the technical contribution - Financial impact of the technical contribution, e.g., generated revenues, costs reduction	**Contributions in this Category normally have significant evidence from this Domain.** Evidence of contribution and impact is similar to that of contributions from Designs, Products, Processes, Algorithms, Systems, and Public/Industrial Contributions	**Contributions in this Category may be supported by evidence from this Domain, but such evidence is not normally expected. Significance-impact should NOT be penalized by the absence of evidence from this Domain.**

Resource: Contribution Characterization Matrix (2)

A small portion of the full matrix, available on Fellow website

	Research Publications	Peer-Reviewed Materials	Designs, Products, Processes, Algorithms, Systems, and Public/Industrial Contributions	Patents/Trade Secrets	Standards
STDC	**Contributions in this Category commonly do not have evidence from this Domain.**	**Contributions in this Category may be supported by evidence from this Domain, but such evidence is not normally expected. Significance/impact should NOT be penalized by the absence of evidence from this Domain.**	**Contributions in this Category may be supported by evidence from this Domain, but such evidence is not normally expected. Significance/impact should NOT be penalized by the absence of evidence from this Domain.**	**Contributions in this Category may be supported by evidence from this Domain, but such evidence is not normally expected. Significance/impact should NOT be penalized by the absence of evidence from this Domain.**	**Contributions in this Category normally have significant evidence from this Domain.** Evidence of impact for a Standards Contribution is generally more extensive than evidence in other Contribution Categories. Documentation of the contribution may use IEEE SA Contributor Collection, Internet Engineering Task Force's (IETF's) RFC, and/or other Standards Development Organizations' or alliances' publications certifying individual contributions or working group meeting minutes. Impact includes: 1) Nominee's impact on the standard, as assessed by reference and endorser testimony, related publications and patent activity, IEEE, or other awards with citations to the relevant standard, degree of incorporation of the task or project into a standard, nominee's recognized technical stature in the field and peer-recognized authority in the standard's Working Group. 2) Broader impacts of the standard, which includes functional, scientific, economic, market and societal aspects.

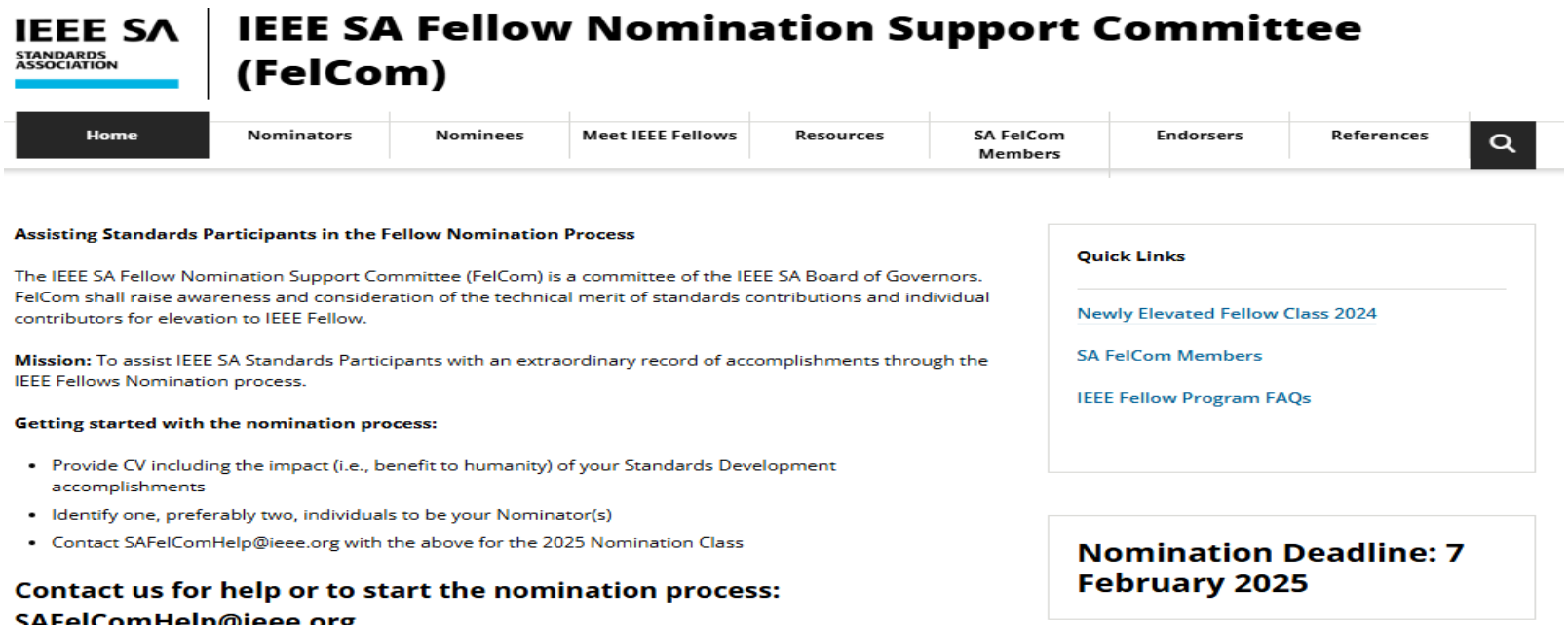
Resource: Contribution Examples Matrix (text from successful nominations)

A small portion of the full matrix, available on Fellow website

	6.a. Identify the individual contribution which qualifies the Nominee for Fellow grade (max 200 words).	**6.b. Verifiable Evidence of contribution** (max 400 words)	**6.c. Impact of contribution** (max 400 words)	**6.d. Verifiable Evidence of Impact** (max 200 words)
TL	Steve Wozniak was the inventor of the Apple I computer, and along with Steve Jobs, founded the Apple Computer Company in 1976 to manufacture the Apple I computer. Along with the Apple II computer, which Steve also designed, these computers were the first broadly available personal computers. Many of the elements now common to all personal computers were first demonstrated in the Apple I and II computers. The Apple I, Apple II, and the Apple Macintosh computers are designated IEEE Engineering Milestones for their pioneering contributions to computing..	1) US Patent No. 4,136,359, Stephen Wozniak, issued Jan. 23, 1979: Microcomputer For Use with Video Display. 2) US Patent No. 4,210,959, Stephen Wozniak, issued Jul. 1, 1980: Controller for magnetic disc, recorder, or the like. The features essential for a personal computer were first encompassed by the Apple I and designed by Steve Wozniak. The Apple I defined the elements of a personal computer, thus making it affordable and useful for "normal" people. The cost reductions that made this possible were 1) an integrated and fully assembled working computer circuit board based on the powerful 1-MHz 6,502 microprocessor, 2) state-of-the-art but low-cost DRAM, 3) the clever sharing of components, 4) the use of a typewriter-style keyboard to replace the front panel, and 5) NTSC output to an owner's existing TV. The Apple I was thus able to realize the goal of a low-cost, easy-to-use personal computer a fully-assembled circuit board with dynamic RAM, video interface, keyboard, mass storage, operating system and a high-level	Prior to the Apple I, hobbyist computers were sold as kits that included components from different companies. Early hobby computers were programmed with front-mounted toggle switches, and indicator lights on the front panel provided output. Separate hardware was required to allow connection to a computer terminal. The Apple I computer was the first product that was sold as a single assembled piece of computer hardware that could be easily used in the home and that was marketed as a personal computer. Unlike earlier hobbyist computers, the Apple I was sold as a fully assembled circuit board containing more than 60 chips. The Apple II computer was the first broadly successful personal computer, and it helped to create the personal computer industry and future generations of microcomputer-based consumer electronic products. Unlike its predecessors, the Apple II was a complete system: it consisted of built-in input (keyboard, cassette interface, and game paddles), built-in output (color graphics, sound, and cassette interface), and built-in software that executed out of ROM (monitor, BASIC	Today, Apple Computer, the company that Steve Wozniak and Steve Jobs founded in 1976 is one of the largest companies in the world. It has grown from its humble Apple I beginnings to a multinational technology company that designs, develops, and sells consumer electronics, computer software, and online services. It is considered one of the Big Tech technology companies. Its worldwide annual revenue totaled $265 billion for the 2018 fiscal year (see Endorsement by MM). As of January 2020, more than 1.5 billion Apple products are actively in use worldwide. The impact of Apple and its founders on the personal computer industry has been commemorated in numerous recent books including: 1) Revolution in the Valley, Andy Herztfeld, O'Reilly Media, October 2011 2) Fire in the Valley: The Birth and Death of the Personal Computer, Michael Swaine and Paul Freiberger, 3rd Edition, Pragmatic Bookshelf, October 2014. 3) The First Apple, Bob Luther, MassMedia mobi, August 2013.

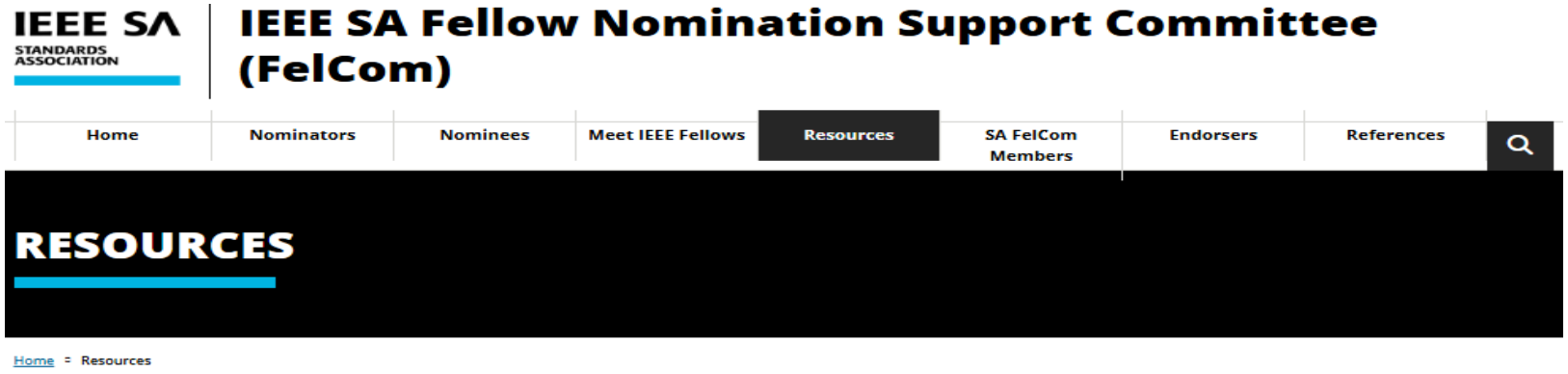
Resource: IEEE Standards Association FelCom (1)

https://sagroups.ieee.org/felcom/



Resource: IEEE Standards Association FelCom (2)

https://sagroups.ieee.org/felcom/



Possible Opportunities for CSSAB

- Within IEEE Computer Society
  - Encourage qualified individuals with standards activity to seek nomination as IEEE Fellow
    - Assist with defining their contributions, impact, and evidence
    - Help identify potential nominators, references, endorsers
  - Encourage Fellows with standards experience to volunteer for Fellow-related committees
  - Provide resources on identifying and evaluating standards contributions within IEEE CS
    - Support the IEEE CS Fellow Search Committee
- Coordinate with IEEE Standards Association on Fellow issues
- Work with Fellow Committee on standards-related issues

Questions & Discussion