Santa Clara Valley Section
Corporate Liaison Program

IEEE Advancing Technology for Humanity

IEEE Industry Engagement Committee

IEEE COMPUTER SOCIETY

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Industry Spotlight Podcast

Nomination and Elevation of IEEE Fellows from Industry–Perception & Reality

Stefano Galli, Past Chair, IEEE Fellow Committee

Tuesday, July 14, 2020, 7:30-8:30am PT, register at: https://forms.gle/n9qQe94tnA3Cb8KQ7

In cooperation with IEEE Industry Engagement Committee and Bangalore and Boston Sections

Outline

- **The Fellow Nomination and Elevation Process**

- **Industry Nominees do very well in terms of elevation!**
  - All raw data used for statistical analysis can be found on the IEEE Fellow website

- **How to write an effective nomination**
  - Resources
  - Tips & Recommendations

- The opinions expressed in this talk are solely my own and do not necessarily express the views or opinions of the IEEE or my employers.

Fellow Nomination Process – Many Moving Parts

- **Nominator**
  - Anybody, including non-IEEE members.
- **Nominee**
  - An IEEE Senior Member in good standing (i.e. dues current) that has been a member for at least five years.
- **Nomination Form (new for 2021)**
  - Description of the best 1 or 2 individual technical or educational contributions and their impact.
    - Provide verifiable evidence of contributions.
    - Provide verifiable evidence of impact of contributions.
  - IEEE and non-IEEE awards, those related to the contributions.
  - IEEE and non-IEEE professional activities.
  - Citation, up to 15 words.
  - Minimum 3 and up to 5 References from IEEE Fellows.
  - Optional, up to three Endorsements.
  - Selection of S/TC for technical review.
  - Selection of nomination category.

- **References (Mandatory, from an IEEE Fellow)**
  - Chosen by the Nominator to advocate.
  - A support from someone well-versed in the specific field and also an independent assessment.
- **Endorsements (Optional, from anybody)**
  - Key for Industry Nominees.
  - Provides additional confirmation of contribution and impact.

- **S/TC Fellow Evaluating Committee**
  - Group of experts in their S/TC fields of interest and are tasked with evaluating Nominees from a technical point of view only.
  - Both an independent assessment (they don't have access to References) and could also be an advocate.
- **IEEE Fellow Committee**
  - Merges all S/TC rankings into a single ranking taking into consideration all input, and recommends to the IEEE Board the top Nominees.

- **Nearly 300 elevations per year**
  - Not more to 0.1% of the IEEE voting membership, as per IEEE Bylaws.

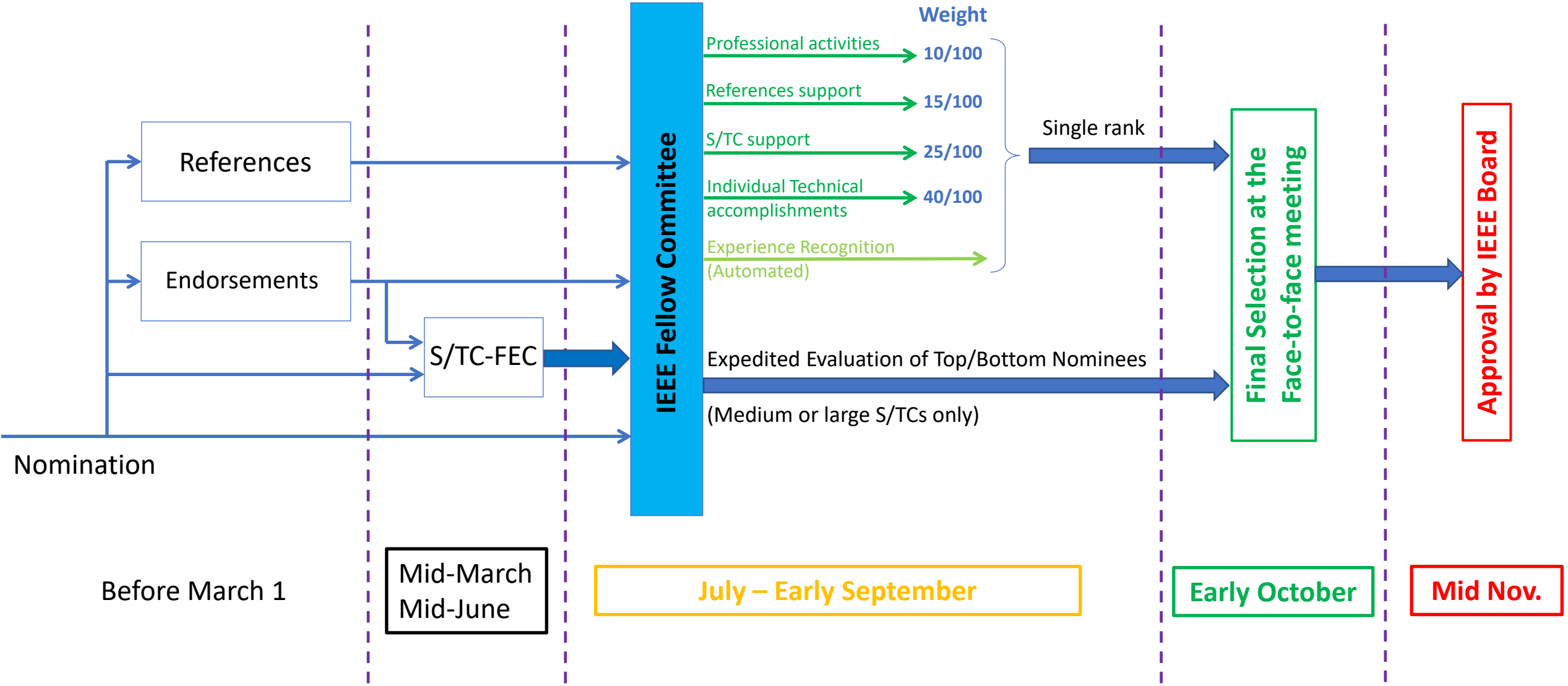
Four Nomination Categories (mean past 10 years)

- **Application Engineer/Practitioner (59 Nominees, 7% of all)**
  - Member composition: 74% industry, 15% academia, 7% government
- **Educator (33 Nominees, 4% of all)**
  - Member composition: 94% academia, 3% industry.
- **Research Engineer/Scientist (693 Nominees, 79% of all)**
  - Member composition: 80% academia, 14% industry, 5% government.
- **Technical Leader (90 Nominees, 10% of all)**
  - Member composition: 51% industry, 27% academics, 17% government.

	Aca	Gov	Ind	Oth
AE/P	1%	0%	**5%**	0%
EDU	**4%**	0%	0%	0%
RE/S	**63%**	**4%**	**11%**	1%
TL	**3%**	**2%**	**5%**	0%

- **COMMON EVALUATION PRINCIPLES:**
  - Must have individual technical or educational contribution(s).
  - Contributions by practitioners in the application of engineering, science, and technology shall be accorded equal recognition with theoretical developments.
  - Impact of contribution(s) must be already evident (no speculation).
  - Verifiable evidence of contribution and impact is required.
  - Required evidence depends on Nomination Category.

The Fellow Evaluation Process



IEEE and S/TCs – Important but Distinct Roles

❑ S/TC Fellow Evaluating Committee

- Provide IEEE Judges with a critical evaluation and an assessment of the degree of qualification of its Nominees, based only Nomination and Endorsement Forms (S/TC do not have access to References' letters) by critically assessing and verifying:
  - The innovation, creativity, importance, impact and degree of acceptance of the contribution(s).
  - The Nominee's individual role in the contribution(s).
  - The impact of the Nominee's contributions.
  - The evidence provided, doing due diligence on the basis of publicly available information.
- The provided evaluation must be based on a technical assessment only, Nominee's service to the S/TC or IEEE is considered only by the IEEE Fellow Committee.
- An S/TC does not see the Nominees referred to other S/TCs, so they see only 5-10% of all nominations.

❑ IEEE Fellow Committee

- Evaluate all Nominees across all S/TCs using:
  - Nomination, Endorsements, and References forms.
  - S/TC-FEC Evaluation Forms (narrative, score, rank).
  - Own due diligence.
- Critically assess how convincing and well-made the case presented by the S/TC Fellow Evaluating Committee is, remembering that IEEE Fellow Committee members do NOT represent their S/TC but the IEEE.
- Critically compare importance and impact of contribution(s) to that of other Nominees.
- Recommend to the IEEE Board a list of Nominees for elevation to IEEE Fellow Grade.

❑ Both must follow the same evaluation principles, as specified in the Fellow Manual!

Elevation of Academic and Industry Members

Elevations	2016	2017	2018	2019	2020
Academia	219	223	209	208	207
Industry	55	54	63	71	56
Total Elevated	**297**	**299**	**296**	**295**	**282**
Total Nominated	**833**	**944**	**919**	**914**	**978**

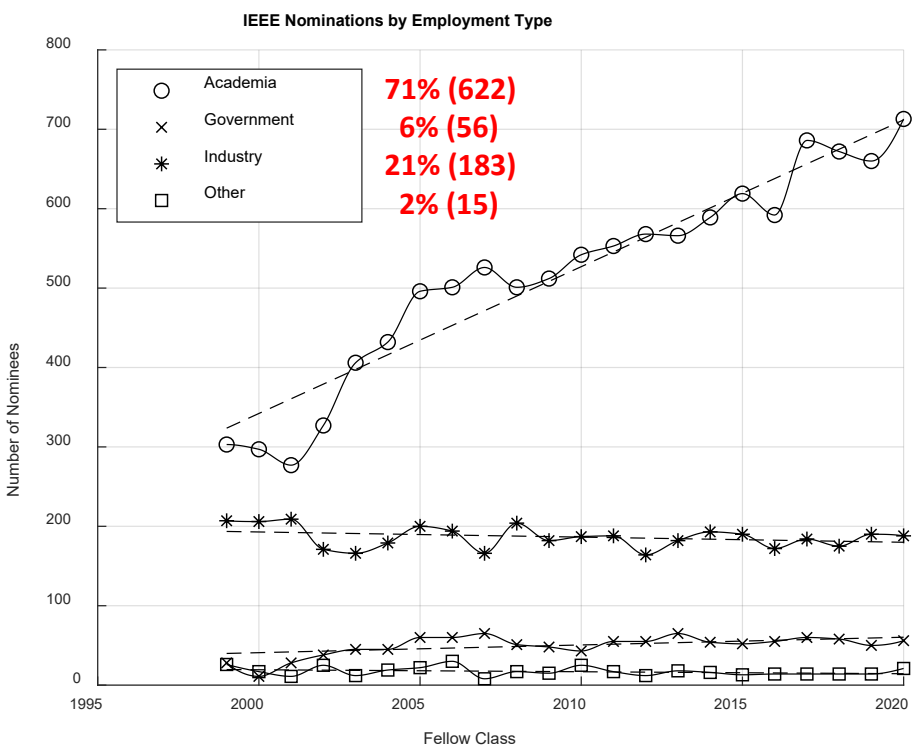
A questions natural arises: Why Are Mostly Academics Elevated?

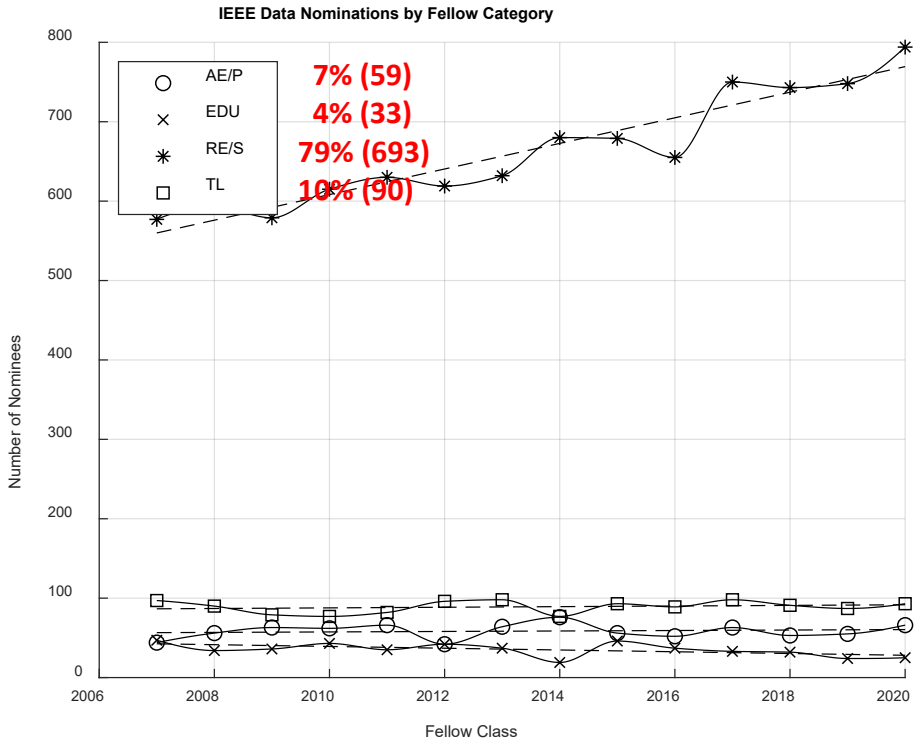
1. Are accomplishments by Industry members not enough for elevation?
2. Are the Fellow criteria unfair and skewed towards Academics?
3. Are Industry/Practitioner members disadvantaged compared to Academics?
4. Are Industry/Practitioners giving up trying due to too many unsuccessful attempts?

Very often, the answer people give to these questions is YES.

However, data analysis suggests that the answer is actually always NO!!!

Why Are Mostly Academics Elevated?

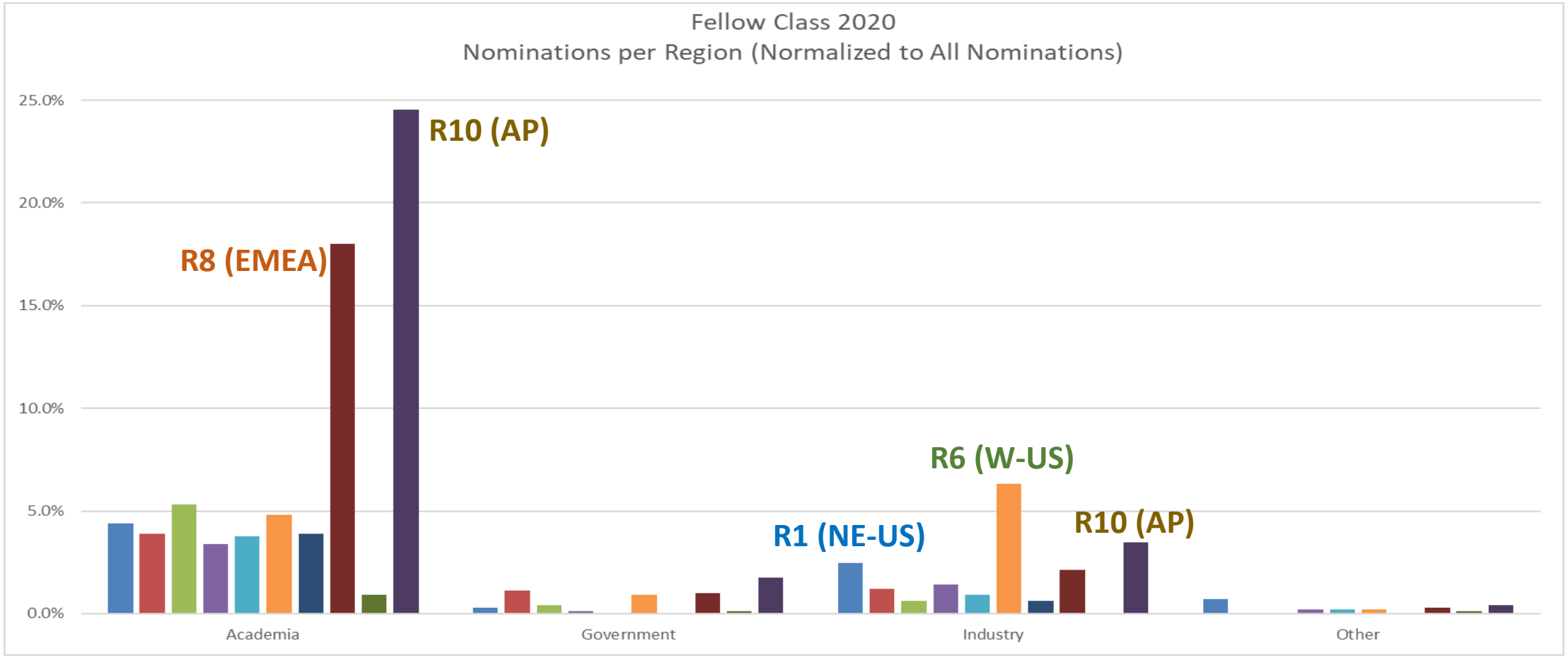




While Industry, AE/P, and TL nominations have been constant for 20 years, Academics and RE/S constitute the largest and fastest growing fraction of IEEE nominations. This growth overshadows everything else!

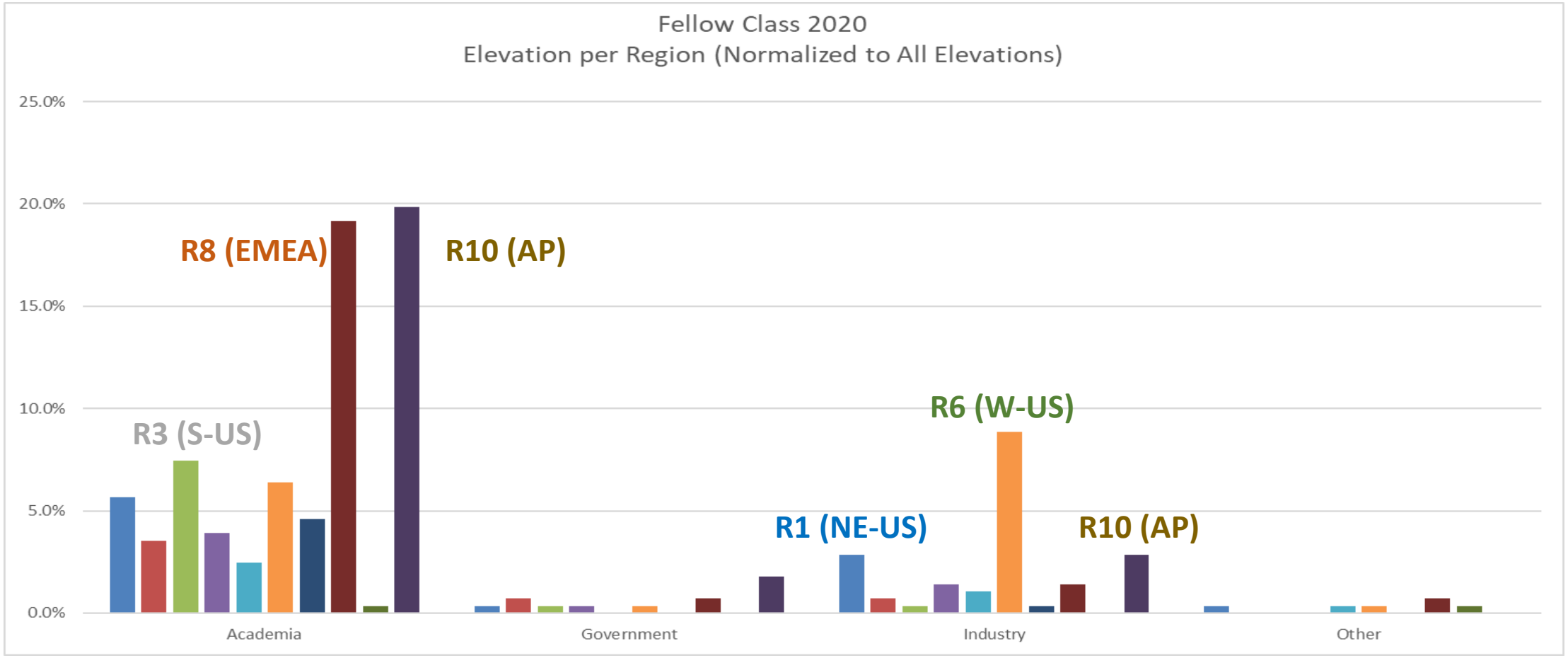
The frustration about what is observed at the <u>output</u> of the Fellow process is caused by this very skewed <u>input</u> to the Fellow process!

Nominations per Employment Type & Region

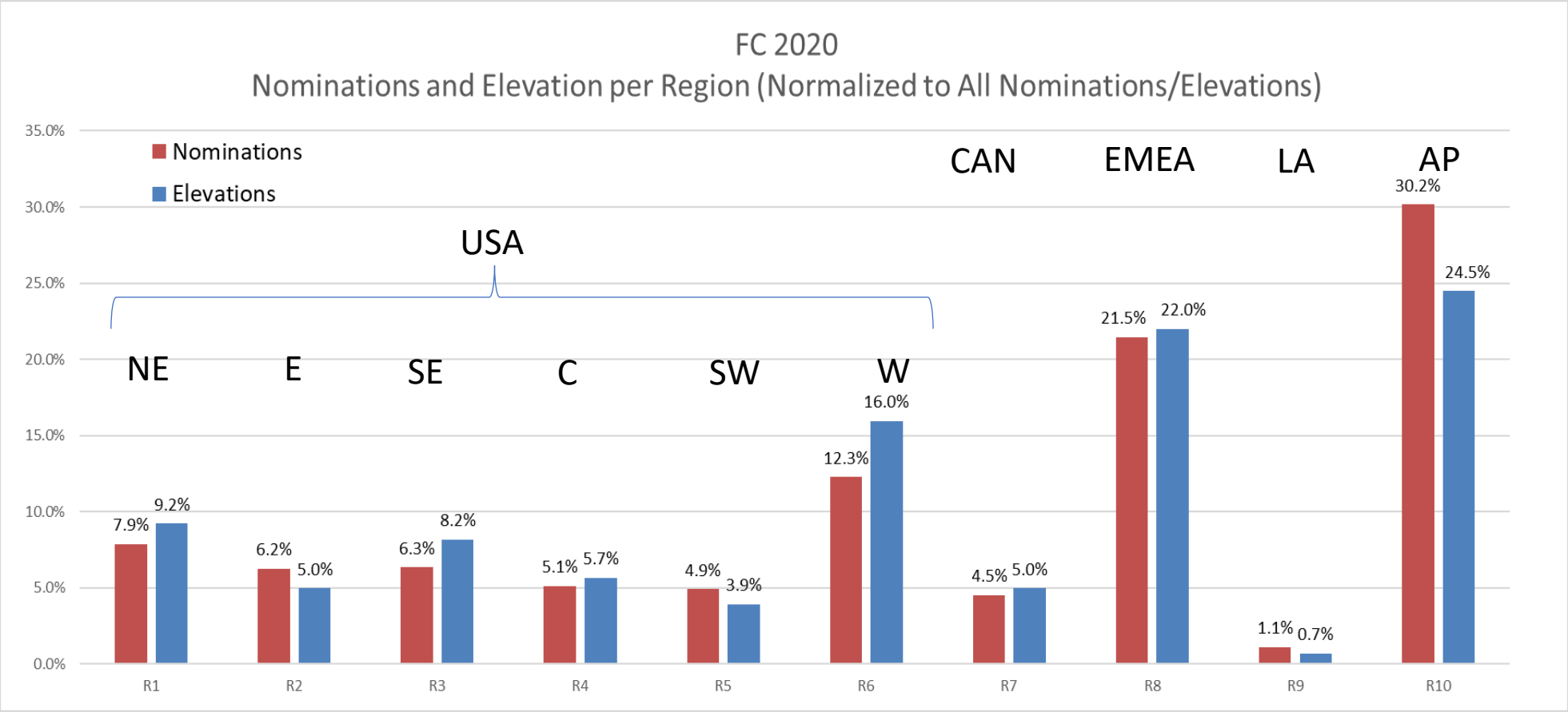


A) **US Regions R1-R6 Contribute 43% of all nominations, while R8 and R10 contribute 52%.**
B) **Academic nominations: 35% (R1-R6), 58% (R8 & R10)**
C) **Industry nominations: 68% (R1-R6), 29% (R8 & R10)**

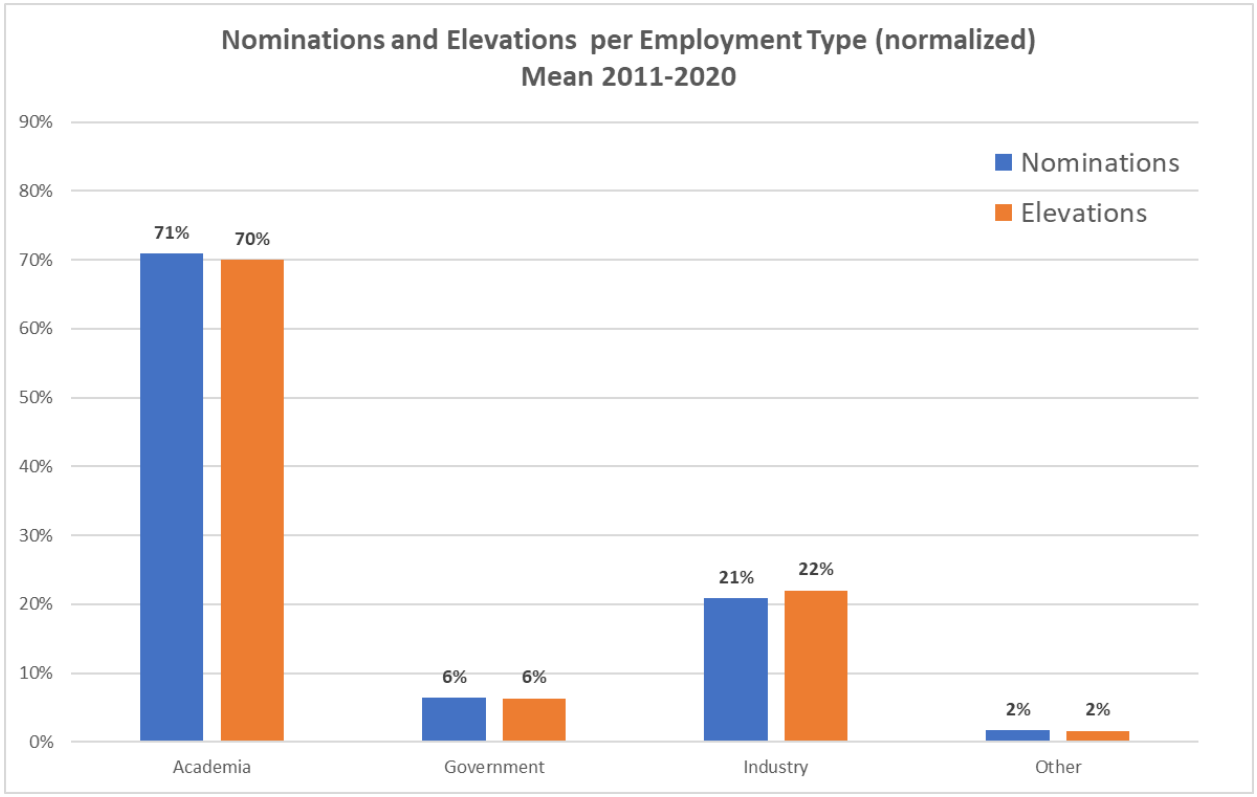
Elevations per Employment Type & Region

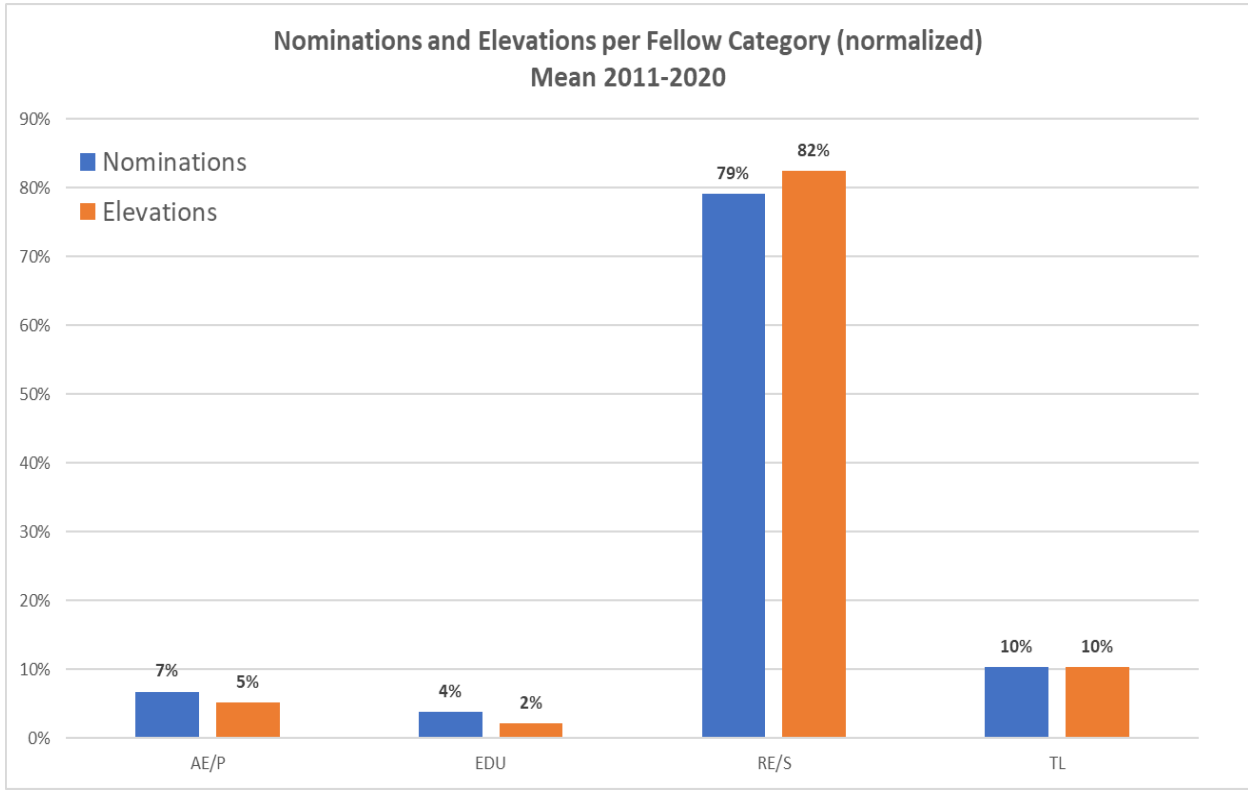


Elevations are Mostly Proportional per Region



Proportionality Across Employment and Categories





Proportionality between nomination & elevation fractions holds very well with respect to employment type!

Proportionality between nomination & elevation fractions with respect to Fellow Categories holds well as well, but RE/S gains at the expense of AE/P and especially EDU.

Elevation Probability

- **Overall Elevation percentage (2011-2020 mean): 35% ± 2.6%**
  - **Academia: 34.1% ± 2.6%**
  - Govt: 34.1% ± 7.7%
  - **Industry: 36.4% ± 4.0%**
  - Other: 31.7% ± 11.7%
  - **AE/P: 26.3% ± 4.6%**
  - **EDU: 19.7% ± 4.8%**
  - **RE/S: 36.0% ± 2.9%**
  - **TL: 34.3% ± 4.1%**

- **While Industry performs a bit better than Academia, the AE/P and EDU categories underperform with respect to RE/S and TL.**

Industry and RE/S do perform better across all segments!

Normalized Nominations				
	Aca	Gov	Ind	Oth
AE/P	**1.1%**	0.5%	**5.0%**	0.2%
EDU	3.6%	0.0%	0.1%	0.0%
RE/S	**63.3%**	4.1%	**10.5%**	1.1%
TL	**2.9%**	1.8%	**5.3%**	0.4%

Elevation Probabilities				
	Aca	Gov	Ind	Oth
AE/P	19.5%	15.0%	28.3%	49.4%
EDU	19.8%	0.0%	30.6%	0.0%
RE/S	35.4%	36.2%	40.1%	34.9%
TL	28.4%	35.8%	38.2%	21.3%

Elevation Probabilities				
	Aca	Gov	Ind	Oth
AE/P	19.5%	15.0%	28.3%	49.4%
EDU	19.8%	0.0%	30.6%	0.0%
RE/S	35.4%	36.2%	40.1%	34.9%
TL	28.4%	35.8%	38.2%	21.3%

Some Initial Considerations

- **Industrial Nominees should look at the Fellow process with renewed optimism!**
  - What *appears* to be a preference in the elevation of Academics is just a consequence of the many Academic Nominees.
  - Industry nominations are still small: Academics have a large network for Nominators/References and elevation enhances faculty careers and university prestige, while Industry does not have the same network and Fellow elevation does not comparably enhance an engineering career. Hopefully, Seminars like this will help grow Industry nominations.
- **Choosing the right Fellow Category is key** as the probability of elevation is dependent on it!
  - Is this because of unfairness? Difficult to say without knowing the distribution of "Fellow-worthiness" across categories.
- **Possible explanations of low AE/P and EDU elevations, perhaps more likely than bias:**
  - The talent pool of RE/S is much larger than that of any other category as academics represent the vast majority of Nominees, thus there are more quality nominations to choose from and these will fill up the available elevation spots.
  - Growing competitive pressure in Industry and the use of trade secrets has greatly affected the possibility of industry researchers and practitioners to make their accomplishments known to the wider community.
  - The RE/S category is perhaps the easiest case to make and evaluate in terms of verifiable evidence of contribution (Academics pursue wide dissemination of their work) and impact (scholarly work has been the object of quantitative assessment and scrutiny for decades).
  - Verifiable evidence of impact is objectively more difficult to present and assess for AE/P and EDU, especially when evidence includes products, implementations, change of industry practices, or development of innovative curricula, publications on education and pedagogy,… the impact of which is not straightforward to assess.
  - Several Nominators, References, and Endorsers and perhaps Evaluators don't seem to have read the Fellow Guides!
    - The amount of badly written nominations, references, and endorsements is really very high.

Resources for Writing Good Nominations

- **The Fellow Evaluation process has never been as transparent as today:**
  - All Fellow principles are clearly specified in the Fellow Operations Manual.
    - TIP: Nominators should start by reading Section 17 of the manual and then move to Fellow Guides
  - Three Fellow Guides have been issued:
    - How to Write an Effective Nomination
    - Effective References and Endorsements
    - S/TC-FEC Evaluators and IEEE Judges ➔ TIP: useful to Nominators as well by reverse engineering!
  - Additional details on how the IEEE and S/TC Fellow Committees operate are specified in Handbooks:
    - The Fellow Committee Handbook.
    - The Society/Technical Council Fellow Evaluating Committee Handbook
  - The IEEE Fellow Committee has started in 2019 to provide feedback to S/TC Fellow Committees.
  - The IEEE Fellow Committee started in 2016 to provide some feedback to Nominators
    - The Nominee ranked in the bottom 1/3 of all Nominees, with a suggestion to wait some time before re-nominating.
  - The IEEE Fellow Committee will start this year to provide improved feedback also to Nominators.

Governing documents and Fellow Guides are available at:

https://www.ieee.org/membership/fellows/ieee-fellow-guidelines.html

The Basics of Fellow Grade Recognition

- **The Fellow grade recognizes extraordinary ***individual technical*** or ***educational*** accomplishments.**
  - The IEEE Certificate of Incorporation states: "*The purposes and objects of the Corporation are: (a) To engage exclusively in scientific and educational activities…*". Restated similarly in the IEEE Constitution.
- **Contributions by practitioners in the application of engineering, science, and technology ***shall be accorded equal recognition*** with theoretical developments.**
  - Practice and theory are equal, a fundamental principle stated in the Fellow Manual
- **Verifiable evidence of individual contributions and their impact is required.**
  - Elevation cannot be granted based only on the claims of Nominator, References, and Endorsers.
- ***Impact* of the Nominee's contributions must have already happened.**
  - Well educated guesses on future impact are not enough.
- **It is not a recognition for:**
  - Service to IEEE – IEEE activities are considered, but they weigh only 10%.
    - Many other recognitions exist to recognize the important contribution of IEEE volunteers.
  - A successful career as a manager or an executive, unless the Nominee has made extraordinary *individual technical* or *educational* accomplishments.
    - Organizational positions cannot be used as *sole evidence* of technical leadership.
    - Many other awards are available to recognize this very important segment of IEEE members.

1st Step: Identify Technical or Educational Contributions

- Technical inventions, discoveries, or advances in the state of the art with a high level of innovation, creativity, importance, and impact on industry, the profession or society at large.
- Technical leadership of a team or company-wide effort that led to an important benefit to technical innovation, the advancement of a device, idea or system leading to development, application and/or production, and society at large. The technical innovation, risk involved, performance improvement, economic results, or other advantages must be above the norm.
  - Nominee's technical role must be crucial for the success of the cited accomplishments.
- Contributions to the design and/or evolution into manufacturing of products or systems, the use, operation, or application of such products or systems, their implementation, and the advancement of industry practices and standards (IEEE or not).
- Impact on education in the fields of interest of IEEE, e.g., development of a new curriculum or courses that are innovative or unique or accredited officially for the first time, authoring a widely used pioneering textbook, published books or papers on education and pedagogy or also in the popular press.
- What is not a technical or educational contribution for Fellows (typical mistakes found in nominations):
  - Receiving a grant, although sometimes grants may be used as evidence of impact of a past contribution.
  - A successful leadership in managing a business line, even if in a technology company.
  - An award is not necessarily evidence of impact of a specific technical or educational contribution.
  - Work done during PhD is certainly a contribution, but it may weigh less than independent work because done under supervision.
  - Volunteering in IEEE.

2nd Step: Choose Contribution, Category, and S/TC

1. First identify the most impactful contributions and then select the contributions that have the strongest verifiable evidence of individual contribution and impact.
2. Choose the Fellow Category based on what the strongest available verifiable evidence is. None is required but some are more suited for a specific category than another (next slide).
3. Select the S/TC whose fields of interest best match the field of the chosen most impactful contributions. Note that:
   a) The Nominee does not have to be a member of that S/TC.
   b) The Nominee does not have to be a known volunteer in that S/TC, but in practice it helps.
4. Write the nomination focusing on the 1-2 most impactful contributions, clearly outlining what they are, what their impact is, and what the verifiable evidence supporting the Nominee's individual role and the contributions' impact is.
5. If you are in Industry and your verifiable evidence is limited, you should request the support of Endorsers! ← The most underestimated tool by Industry members
   a) Endorsements can shed light on contributions that may be proprietary or not available for citation in the literature and can be used to incorporate any additional evidence on the Nominee's technical contributions and impact.
   b) Endorsements are most effective when provided by company officers, program directors, standardization officers, or colleagues who are in a position to attest and verify the Nominator's claims on impact and individual role.

Best Evidence for Each Category

Category	Impact					Evidence of Impact
	Scholarly Publications	Patents	Products/ Services	Standardization	Peer Recognition	
AE/P	Not expected or required (but always useful if available)	Expected, typical, & very useful	Expected, Typical, & Very useful	Useful if available, but not necessary	Useful if available, but not necessary	**Citation of patents:** indicator of their pioneering nature. **Revenues** from patents and Products enabled by nominee. **Peer Recognition:** Specific Awards (e.g., induction to Inventor's Hall of Fame). **Endorsements** to verify nominator's claims on **impact** and individual **role** of Nominee.
Edu	Expected, Typical, & Very useful IF in Education-oriented Publications	Not expected or required (but always useful if available)	Not expected or required (but always useful if available)	Not expected or required (but always useful if available)	Very useful, especially for Educational-oriented awards & recognitions	**Citations** of Educational-oriented publications. **Endorsements** stating the adoption of pioneering textbooks authored by the Educator.
Re/S	Expected, Typical, & Very useful	Very useful, especially for Industry RE/S	Very useful, especially for Industry RE/S	Useful if available, but not necessary	Expected, typical, & very useful	**Citations** of non-tutorial publications. **Endorsement** stating that a publication influenced a standard. **Peer Recognition:** Specific awards, # of keynotes, # of invited papers.
TL	Not expected or required (but always useful if available)	Expected, typical, & very useful to support the nominee's technical innovation used to enable the project or initiative	Expected, typical, & very useful to describe the outcome of the project or initiative	Useful if the project/ initiative impacted a standard	Very useful to recognize role of nominee in succesful initiative outcome	**Endorsements** to verify nominator's claims on **impact** and individual **role** of Nominee.

For each category, the color-code illustrates the usefulness and typicality of different types of evidence

Legend:

Expected	Very Useful, Good to Have	Useful, not Typical	Not Expected, but Useful

Source: Piero Bonissone
IEEE Fellow Committee Vice-Chair

Evidence & Impact – What Evaluators Are Told (1/2)

- When assessing **scholarly publications** take into account that not all publications are the same: look at the type of articles, the journal impact factor, the number of co-authors, the number of citations, etc. Papers are certainly items of contribution but there are additional things to consider to estimate the impact of a contribution:
  - Tutorial/survey papers are often highly cited but are not necessarily evidence of a technical contribution.
  - If the Nominee is one of many co-authors, the individual role must be explained and possibly confirmed by co-authors (References/Endorsers).
  - If scholarly papers are used as items of evidence, it is perfectly legitimate to consider bibliometric indices as a means to assess impact but citations should NOT be used as the only means to assess impact also because the typical citation counts depends on the field.
  - Other types of impact can be more powerful than citations: impact on technology or practice, inclusion in standards, impact on products, impact on society at large. However, Nominators often stop at citations!
  - AE/P and TL are not required to have scholarly publications and cannot be penalized for not having them.
    - If papers are used as evidence, bibliometric indices should be used with caution as "practical" papers tend to be less cited than academic ones.
    - Lowly-cited papers can be used as evidence of contribution but the Nominator still must demonstrate impact, e.g., inclusion in standards, licensed patents, implementation in successful products, etc. effective endorsements are key in these cases.
- Impact of **products** can be measured by popular usage, mentions in press releases, level of innovation versus state of the art, revenue stream generation, etc. The right Endorser could clarify these things, including shedding light on the individual role of the Nominee.
- Impact on **standardization** can be achieved in many ways: submitting influential contributions that were included in the issued standard (especially if mandatory features), led technical discussions and drove the Working Group to consensus; writing an influential paper containing findings that were adopted in a popular standard; an inventor whose forward-looking patents became later essential to popular standards.
  - The most difficult part is to demonstrate the individual role as standardization activities are intrinsically team activities, i.e., the team in the company supporting the Nominee and the standardization Working Group itself.

Evidence & Impact – What Evaluators Are Told (2/2)

- Impact of **patents** is not straightforward to assess since order of authors may not reflect the level of individual contribution and issued patents may not even be valid (sometimes invalidated by courts). Important things to consider that could be verified by the right endorsers:
  - Is it a Design or Utility patent (for US patents)? An explanation of why a Design patent is included as evidence is recommended.
  - Which patent claims (independent or dependent) were contributed solely by the Nominee, in the case of multiple inventors?
  - Has the patent been sold or licensed to a third party for use? If yes, what are the revenues?
  - Is the patent important for the assignee to remain on the cutting edge of the technology area being described? If yes, the Nominator should explain the competitive edge the patent describes.
  - Has the patent spurred a new family of IP? If yes, a brief summary of the family or families created should be given.
  - Has the patent been deemed essential to products or standards?
  - Has the patent been often cited? Note that Google Scholar indexes patents
- **Peer recognition** can take many forms: awards (technical, best paper, company recognitions, induction in national academies, inventor's hall of fame, etc.), keynotes, honorary degrees, invited paper, etc. Also notoriety in the popular press can be indicative of having had impact, e.g. appearing in TV to discuss technology, being mentioned in newspapers articles, etc.
- **Endorsements** are very useful when little *verifiable* evidence of impact exists, as it may be for some Industry or Government Nominees. In these cases, endorsements are 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.

Choosing References and Endorsers

❑ References

- References are highly valued when provided by experts in the specific field of the Nominee's contributions, but do not choose References that do not know the Nominee's work and are not able to address the Nominee's specific accomplishments.
- Do not choose only References who have collaborated with the Nominee.

❑ Endorsers

- Do not misuse Endorsements by using them as pseudo-References that the S/TC Fellow Committee can read.
- Endorsements have a specific role:
  - ➢ Strengthen the Nominee's contributions in those instances for which verifiable evidence is limited.
  - ➢ Provide additional information directly supporting the technical accomplishments or their impact as well as professional contributions that may be missed in the nomination.

❑ **For both: do not choose too many References or Endorsers from only one region of the world or from the Nominee's company.**

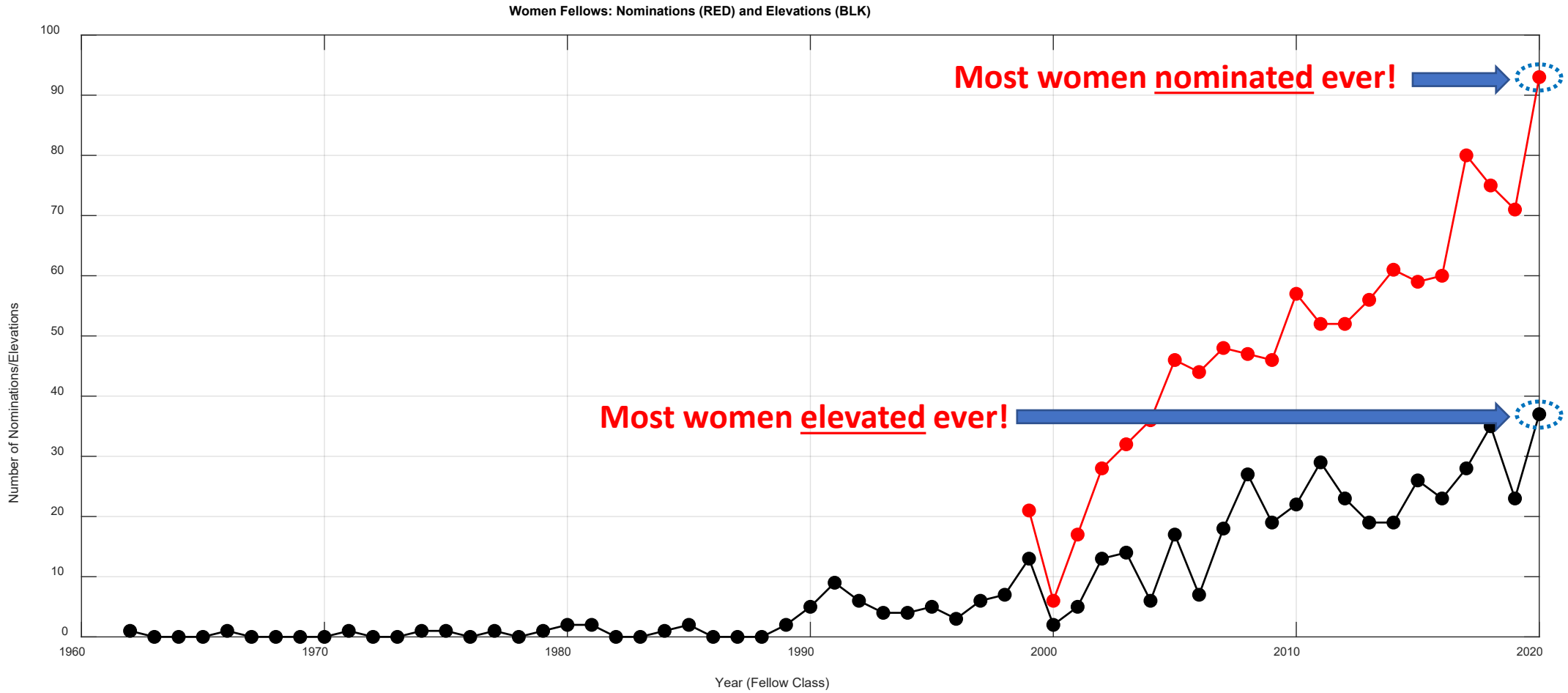
Writing References and Endorsements

- **References**
  - Provide details in the bio section that confirm you are an expert in the Nominee's technical field.
  - Focus mostly on the specific contributions listed in the nomination, and less on the career of the Nominee.
  - Describe the Nominee's contributions in your own words and provide your own interpretation of their value.
    - It is appropriate to reinforce what has been stated in the nomination but avoid cutting-and-pasting from it.
- **Endorsers**
  - Explain clearly why the endorsement is being provided, i.e. what information is being provided to reinforce the Nominator's claims or to introduce something that is not included in the nomination.
  - Clearly articulate what the Nominee's individual contributions were in a team.
- **For both:**
  - Provide specific examples of how the Nominee's contributions have impacted the technical field, the industry, research at other institutions, or resulted in new practices, products or standards.
  - Provide both qualitative and quantitative measures of the Nominee's contributions.
  - Avoid generic and grandiose statements that do not pertain directly to the Nominee's main contributions.
- **It is not easy to tell somebody famous what to do… but the Nominator must try ;-)**

Concluding Remarks

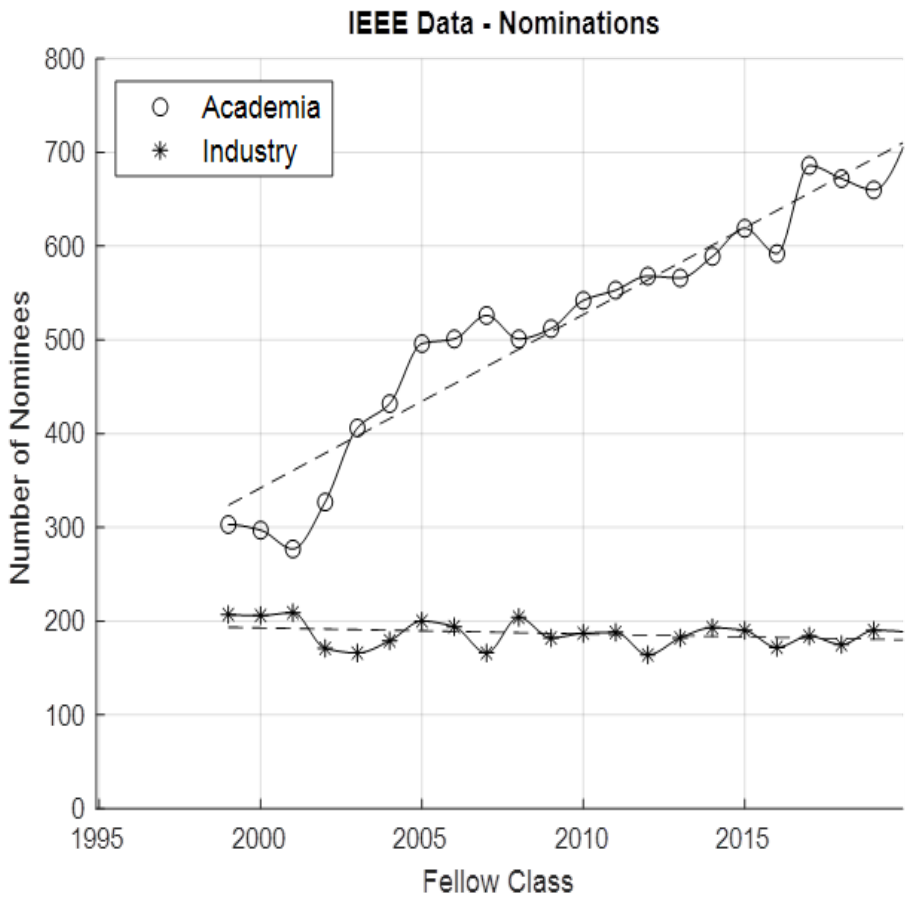
- Industry Nominees are an important part of IEEE membership, and it is vital to recognize deserving Industry members for their accomplishments.
- Data supports the notion that Industry members have a very good shot at elevation, so I encourage them to get nominated with confidence.
  - Elevated Industry Nominees are elevated after an average of 1.5 attempts while 90% of those are elevated within 3 attempts ➔ Don't get discouraged at the 1st unsuccessful attempt!
- With ~1,000 nominations, Nominees face unprecedented competition today so it is key to write an effective nomination.
  - Read the Guides, it is essential!
- AE/P category is still not well understood, especially by Nominators. Although it is a small segment of all Nominees (7%, or 45 new nominations per year), it is important that the accomplishments of all our members get due recognition.
  - Read again the Guides ;-)
- Not only Industry members can look at elevations with optimism…

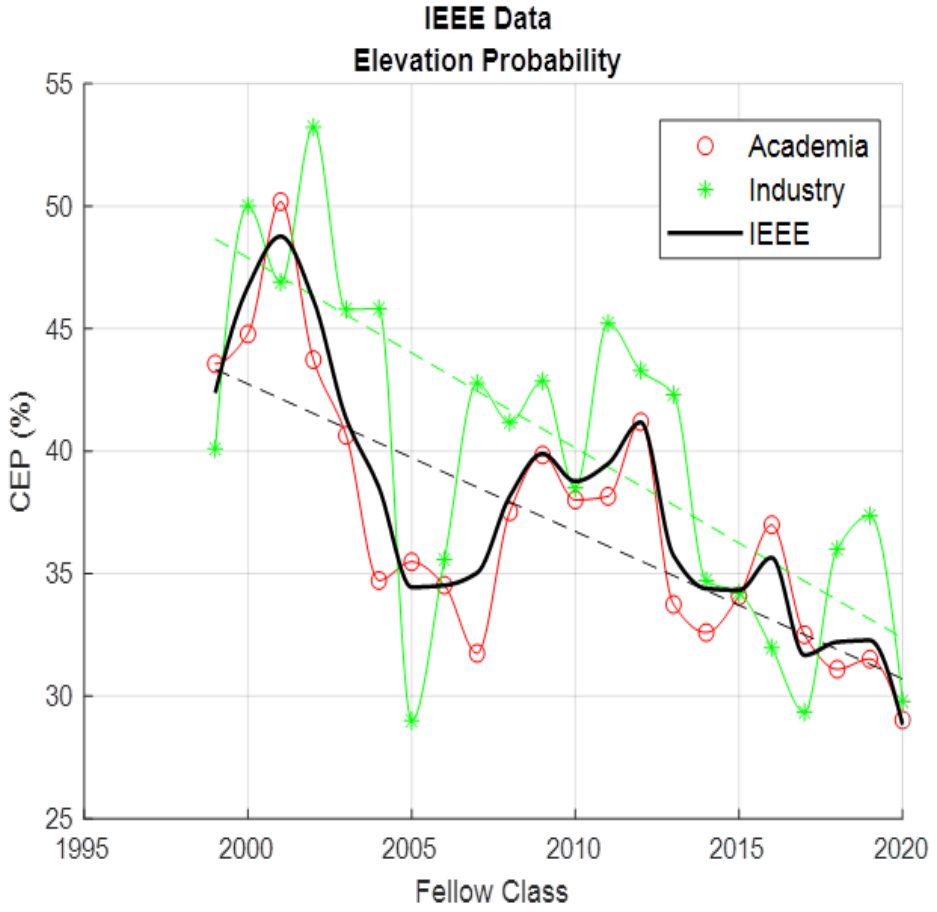
Women Also Can Look at Elevation with Optimism



Backup Slides

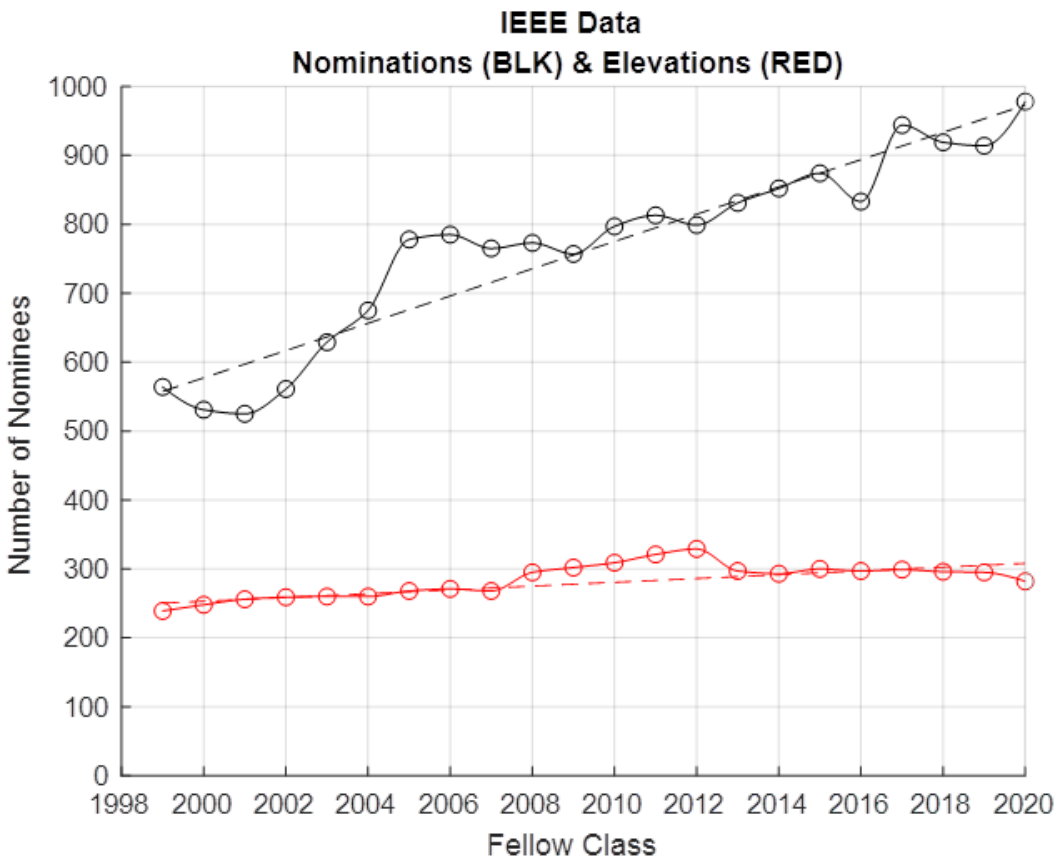
Fellow Nominations and Elevations Over Time

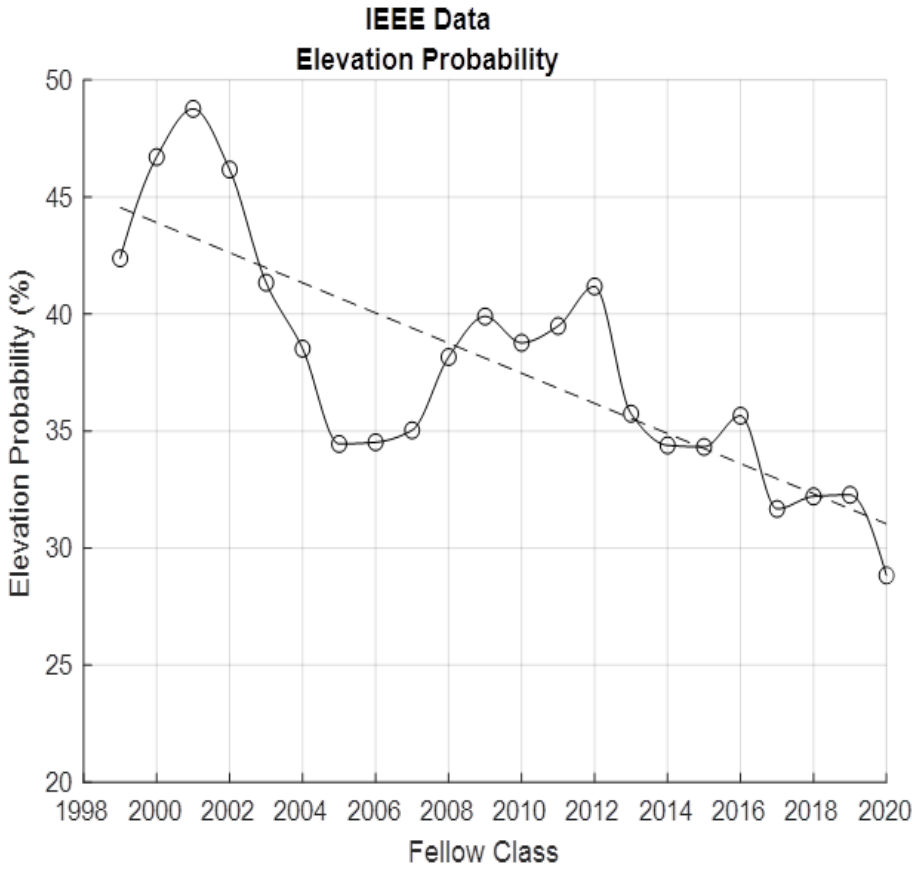




Nominations of Industry members has been constant for the last 22 years, despite the elevation probability went down from ~50% to ~30%. Same thing holds for AE/P and TL.

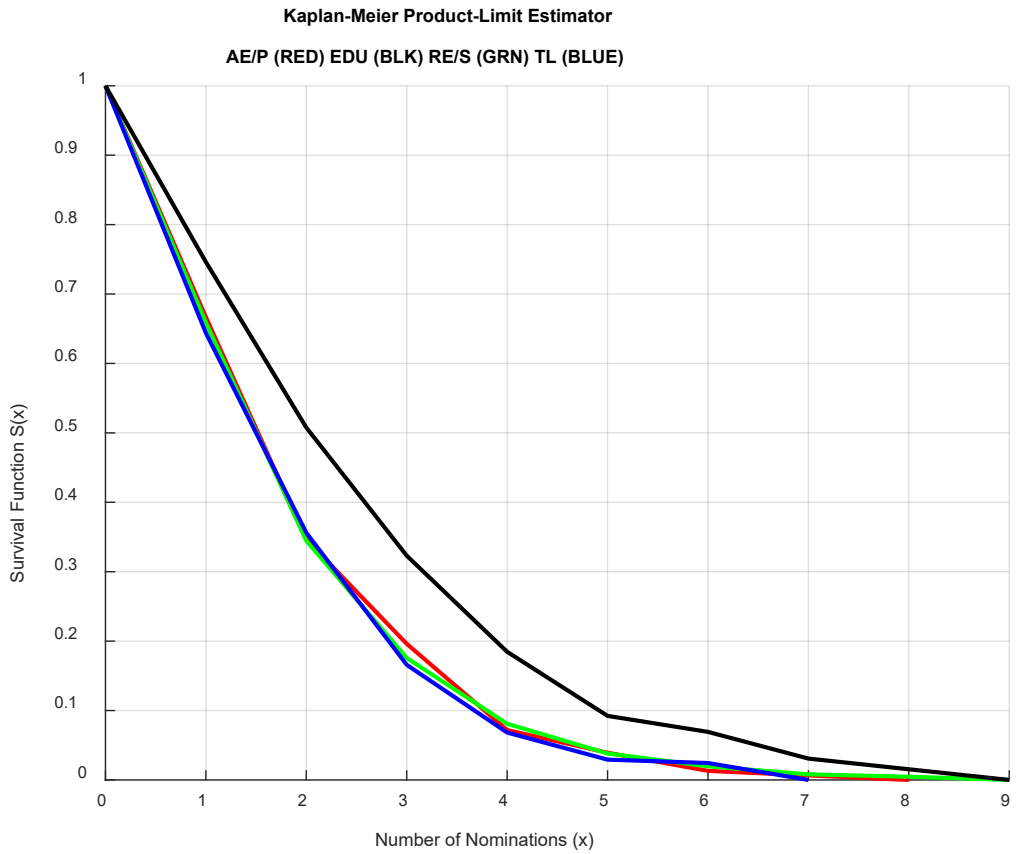
It is Today More Difficult to Be Elevated





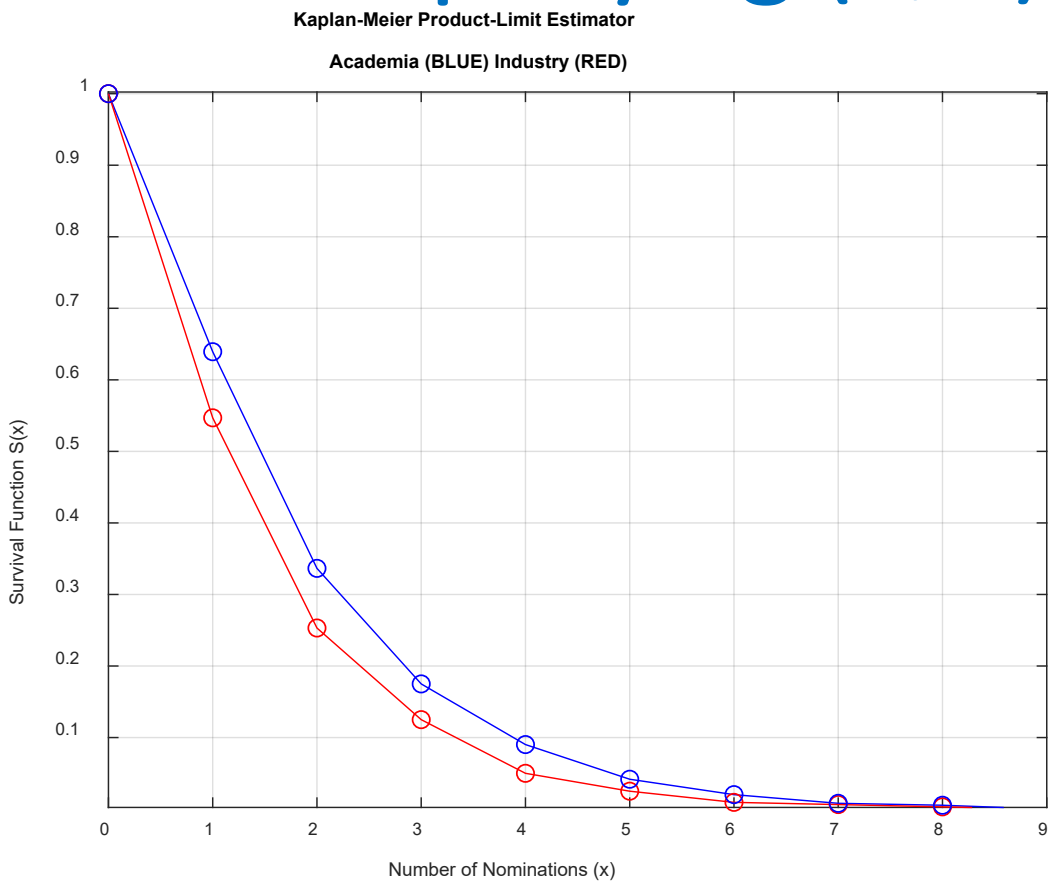
Not because of the Fellow principles or the evaluation criteria which have not changed:
There are more nominations than ever before for a similar number of available spots (0.1% of voting membership).

Nominees that Gave Up Trying (1/2)



The Survival Function S(x) assign to Nominees the probability of being re-nominated more than "x" times (measured as number of re-nominations). Here we see that Nominees in all Fellow Categories except EDU have the same chances to be re-nominated (*survive*).

Nominees that Gave Up Trying (2/2)



The Survival Function S(x) assign to Nominees in a group the probability of being re-nominated more than "x" times (measured as number of re-nominations). Here we see that Academic Nominees have higher chances to be re-nominated (*survive*) compared to Industry Nominees. However, the delta is small and gets smaller over time.