Recommendations

Area Model, Governance, Keywords, Transition Plan

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Update: see Amended Recommendations from 23 Oct 2019

Introduction

This document details the activities and recommendations of the reVISe committee since its inception in February 2019. reVISe was struck by the VEC (VIS Executive Committee) following a recommendation of the VIS Restructuring Committee (cf. the Berlin report), with a mandate to develop concrete proposals for an area model and governance structure to (unify the V-I-S conferences: VAST, InfoVis, and SciVis.

The following slides document in brief our process, and a detailed overview of

- an area model that unifies V-I-S in regard to scientific content, and
- a corresponding governance structure that can support a unified VIS conference,

both of which we propose for adoption in the near term; for this, we discuss possible transition plans.

Furthermore, as a byproduct of our considerations, we developed

- a new set of keywords for use by authors and reviewers, to replace the current set used in PCS.

Note: In this document, we use V-I-S to denote the three current main conferences, and we use VIS to indicate the whole umbrella conference.

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    - Area 2 (~~DS~~APP): ~~Design Studies and~~ Application-Focused Research
    - Area 3 (SARM): Systems, Architectures, Rendering, Modalities
    - Area 4 (V&I): Visual Representations & Interaction Techniques
    - Area 5 (DATAX): Data Transformation, Refinement, Extraction, Augmentation, and Management
    - Area 6 (WDML): Integrated Workflows, Decision Support, and Machine Learning
  - **Papers Chairs Committee:** 6x2 Area Papers Chairs and 2 Overall Papers Chairs
  - **Unified Program Committee:** no per-area subcommittees
- Governance
  - **Visualization Council:** Long term strategic and policy matters; appointment of papers chairs committee; ratification of specified VEC appointments and decisions, & area evolution proposals
  - **Visualization Executive Committee (VEC2):** Operational, multi-year aspects of the conference and the executive organization, proposing appointments for most of Organizing Committee.
  - **Area Curation Committee:** Monitoring of areas and related topics such as keywords, proposing area-related motions to Visualization Council.

Executive Summary II

- Papers Review
  - Area Papers Chairs draw from single unified PC
  - Efficient PC bidding possible despite scale of papers thanks to new keywords below
  - Authors must designate primary area, may designate secondary area
- Submission and Reviewing Keywords
  - 75 in 4 categories: Data Types, Intended Contributions, Application Areas, Topics
  - Replaces current PCS keywords (127 across 14 categories)
  - Authors pick multiple items in each category when relevant; supersedes current paper types
- Transition Plans
  - Obtaining approval from VGTC ExComm and TVCG
  - Seeding new committees from old
  - Timeline for rollout in 2020 to affect VIS 2021

Process

Minutes and Working Documents

reVISe met weekly in a one hour teleconference since its inception.

- Summarized meeting minutes

reVISe produced several working documents, collected here:

- reVISe committee design goals, an early set of internal guidelines and objectives
- Investigation of area models used by other conferences, which considers the landscape of area proposals across conferences that operate in fields adjacent to VIS.
- Criteria for a good area model, a set of design goals for any area model proposal we would develop.
- An evaluation of the distribution of VIS papers from the 2017-18 into proposed areas.
- Submission and reviewing keywords: draft, community surveys for authors and reviewers
- Recommendations for submission and reviewing keywords, Sep 2019
- Paper Area Model Coding spreadsheet used to assess final area model balance

Stages of Work

Our initial work included assessments of other conference area models, and considering general criteria for area models.

We started by working in parallel on developing multiple area models, and assessing their strengths and weaknesses by coding recent and current VIS papers into the categories of each proposed model to check for coverage and balance. We considered data at several levels of granularity: VIS session titles, paper titles, abstracts, the full paper (for the past few years at VIS), and the VIS call for papers.

We spent a significant amount of time developing a new set of keywords. These new keywords are intended both to replace the current set of PCS keywords to better support reviewers and paper matchups in the assignment/bidding process, and also to serve as input for refining area model proposals. Our iterative process involved a synthesis of both manual and algorithmic analysis across many data sources including the current PCS keywords usage, author-proposed freeform keywords, and full-text analysis of the papers and abstracts. We are also assessing the coverage/balance of these keywords by coding papers.

After finalizing the keywords, we returned to the problem of area models.

Finally, we developed a proposal for governance that fits with the area model, and fulfills other important criteria, such as ensuring the quality of the conference content, and fair representation of the community.

Next Steps

The mandate of reVISe was to develop concrete recommendations for the VEC and the steering committees, which are the decision-making governance bodies for IEEE VIS. Any decisions made by these governance bodies to change major aspects of the status quo will require further work with additional entities.

- Changes to the VIS governance structure will require ratification by the VGTC ExCom, which is the oversight body that must approve an amended charter for the VEC. Although the current V-I-S Steering Committees do not have formal charters, it would be appropriate for the ExCom to approve a new charter for the proposed Visualization Council that supersedes them.
- Changes to the VIS papers reviewing process in the form of the proposed area model and the proposed papers chair structure will require ratification by both TVCG and the VGTC ExCom, through a new MOU (Memorandum of Understanding) that would be signed by both parties.

A deliberate choice was made to explore options internally within the VIS community; the consequence of that choice is the need to then negotiate with key external stakeholders. Although in many cases individual people have dual roles as both members of the VIS community and holders of external offices, the process of change will require explicit formal engagement with these entities at a structural level.

Area Model

Introduction & Process

This set of slides presents an Area Model that is recommended by the reVISe Committee.

The model arose after considering many alternative models, taking into account several factors including subject cohesion, area size, reviewer expertise, understandability to the community, and rough balance between areas for likely submission numbers.

It was iteratively developed: many proposals were generated, with deliberately broad brainstorming in early phases, and assessed for balance by estimating the number of submissions for each area. The final proposal was more thoroughly assessed through coding papers in a similar process to the keywords validation (2 independent coders over 2 years of papers, from VIS 2017 and VIS 2018).

This area model is designed to work with a review process featuring a pair of area papers chairs for each area, who draw reviewers from a single unified program committee. This custom area review model does not directly map to any existing conference.

Proposed Areas

The model facilitates a transformation from the current V-I-S area model to a new area model consisting of six areas, namely:

- Area 1 (T&E):
  Theoretical and Empirical Research
- Area 2 (APP):
  Application-Focused Research
- Area 3 (SARM):
  Systems, Architectures, Rendering, and Modalities
- Area 4 (V&I):
  Visual Representations and Interaction Techniques
- Area 5 (DATAX):
  Data Transformation, Refinement, Extraction, Augmentation, and Management
- Area 6 (WDML):
  Integrated Workflows, Decision Support, and Machine Learning

Overall Considerations

- Target area sizes through number of submissions: ideal 100; min 50, max 150
  - Principle: submission sizes should be driven by the ability of chairs to manage submission (upper bound) and potential conflicts of interest and with acceptance rates across areas (lower bound).
  - Reduce current papers chair workload to be manageable: The current size of ~200 submitted papers for one set of V-I-S papers chairs is too high of a load, decisions about borderline papers are difficult at this scale.
  - Avoid too-small areas to ensure fairness and keep logistics of overall process manageable.
  - Define areas such that submissions are loosely balanced across areas
- Trade off subject cohesion and practical considerations
  - Capture existing and emerging intellectual coherence
  - Consider likely linkages in reviewer expertise
  - Consolidate multiple subareas together if each too small to stand alone
- Ensure respectful intellectual diversity under one conference
  - Retain and broaden diversity in terms of topic and contribution type
  - Avoid artificial boundaries regarding topic or contribution type
  - Distribute expertise beyond sub-conferences
  - Encourage cross-cutting research

Area 1 (T&E): Theoretical and Empirical Research

This area focuses on **theoretical and empirical research** topics that are generic to other areas in this Area Model. The theoretical research aims to establish the foundation of VIS as a scientific subject through concept formulation, mathematical formalization, and model development. The empirical research aims to make observations, conduct evaluation, test hypotheses, and gain an understanding of fundamental questions in visualization. These questions may be about how visualization works in general or about the interplays between specific human factors and systems factors in particular, e.g., the design of visualization representations, interactions, algorithms, and systems; the users' perception, cognition, knowledge and biases; and the tasks of visualization and the application contexts. While the theoretical research topics could be grouped together cohesively, the total number of papers in the current VIS conferences suggests that they are not ready to form an independent area and are, therefore, grouped with empirical research topics. Topics of interest include:

- **Concept Formulation:** surveys with organization, synthesis, and reflection; taxonomies and ontologies; guidelines and principles; lexica, syntaxes (grammars), semantics, pragmatics of visualization; and information security, privacy, ethics and professionalism in visualization.
- **Model Development:** conceptual models and simulation models for describing aspects of visualization processes (e.g., color perception, knowledge acquisition, collaborative decision making, etc.).
- **Mathematical Formalization:** mathematical frameworks, quality metrics, theorems (i.e., mathematically-defined causal relations in VIS).
- **Research Methodology:** general methodologies for conducting VIS research, e.g., typology, grounded theory, empirical studies, design studies, task analysis, user engagement, qualitative and quantitative research, etc.
- **Empirical Studies:** controlled (e.g., typical laboratory experiments), semi-controlled (e.g., typical crowdsourcing studies), and uncontrolled studies (e.g., small group discussions, think aloud exercises, field observation, ethnographic studies, etc.), which may be in the forms of qualitative or quantitative research and which may be further categorized according to their objectives as follows:
- **Empirical Studies for Evaluation:** studies for assessing the effectiveness and usability of specific VIS techniques, tools, systems, and workflows, for collecting lessons learned from failures, and for establishing the best practice.
- **Empirical Studies for Observation, Data Acquisition, and Hypothesis Formulation**: studies for observing phenomena in visualization processes, stimulating hypothesis formulation, and collecting data to inform computational models and quality metrics.
- **Empirical Studies for Understanding and Theory Validation**: studies for understanding the human factors in visualization processes, including perceptual factors (e.g., visual and nonvisual sensory processes, perception, attention, etc.) and cognitive factors (e.g., memory, learning, reasoning, decision-making, problem-solving, knowledge, emotion, etc.)

Area 2 (APP): Application-Focused Research

This area encompasses all forms of **application-focused research**, which may aim to solve an application-motivated technical problem, to formulate the best practice in working with domain experts to transform general-purpose visualization technology to domain-specific solutions, to design and develop visualization systems and visual analytics workflows for supporting individual applications, or to gain insight into how to adapt and optimize visualization technology to support the users in a particular application domain. The technical solutions reported in this area are mostly application-specific and usually developed in collaboration with domain experts, though there can be exceptions. These solutions can be in different forms, such as designs of visual representations and interaction techniques, descriptions of algorithms and techniques for data transformation, prototypes of visualization hardware and software, specifications of workflows and best practice, or design studies. Topics of interest include:

- **Application Domains**: Visualization and visual analytics research related to any application domain, including: physical sciences (e.g., mathematics, physics, chemistry); life sciences (e.g., biology, medicine, healthcare); earth, space, environmental science; engineering (e.g., civil, mechanical, chemical, electrical and electronic engineering); computing (e.g., computer science, data science, information science, software engineering, computer simulation); social sciences (e.g., political science, sociology, economics, psychology, human geography, archaeology, anthropology, criminology, law); arts and humanities (e.g., classics, literature, languages, linguistics, history, philosophy, theology, religion, music, visual arts, performance arts); business and finance; industry (e.g., agriculture, energy, manufacturing, transport); media and social media; entertainment and sports; governance (e.g., emergence, resilience, law enforcement, security, privacy); education; visualization for the masses, etc.
- **Application-specific Technical Solutions**: visual representations, interaction techniques, algorithms, techniques, hardware prototypes, software prototypes, integrated workflows, recommended working practice, etc.
- **Insight Documentation**: success stories and failures about applying visualization technology in practice, achievements of multidisciplinary research projects, benefits gained from collaboration with domain experts, and guidelines resulting from application-focused design studies.

Area 3 (SARM): Systems, Architectures, Rendering, and Modalities

This area focuses on the themes of building **systems**, algorithms for **rendering**, and alternate input and output **modalities**. Papers submitted to this area may present new visualization system **architectures**, support different computing platforms and development environments, or exploit commodity and specialized hardware devices for either rendering or interaction modalities beyond the desktop. The rendering theme includes algorithms and techniques both in software and through hardware acceleration, and also algorithms for graph layout and label placement. Topics of interest include:

- **Computing Platforms:** commodity hardware, GPU, HPC, energy efficient visualization algorithms and hardware, etc.
- **Visualization Environments:** non-immersive and immersive environments, desktop, mobile, web-based, VR/MR/AR, dome theaters, CAVEs, physicalization, remote collaboration, etc.
- **Display Hardware and Output Devices:** large and small displays, stereo displays, volumetric displays, 2D/3D printing, non-visual devices, etc.
- **Interaction Modalities:** touch, pen, speech, gesture, haptics, etc.
- **Development Environments:** programming languages, software libraries, authoring systems, visualization toolkits, software frameworks for integration and interoperability, etc.
- **Processing Paradigms:** parallel, distributed, out-of-core, progressive, streaming, in situ, in transit, etc.
- **Engineering Visualization Systems:** visualization system lifecycle, testing, performance analysis, verification, validation, etc.
- **Visualization Systems:** general-purpose and application-specific plug-ins, apps, tools, systems, multi-system workflows, etc.
- **Data and Software Resources:** open data, open source software, benchmark data, reproducibility, authentication, etc.
- **Rendering Techniques:** surface rendering, volume rendering, point cloud rendering, line cloud rendering, spectral rendering, global illumination, stylized rendering, transfer functions, etc.
- **Placement Techniques:** object placement, graph layout, word/tag cloud, etc.
- **Other Synthesis Techniques:** fabrication, sonification, haptic feedback, etc.

Area 4 (V&I): Visual Representations and Interaction Techniques

This area focuses on the **design of visual representations and interaction techniques** for different types of data, users, and visualization tasks. In principle, the **data** concerned can be of any data types, such as spatial or non-spatial; continuous or discrete; statistic, temporal or streaming; numerical, textual or imagery, etc. The **user** concerned can be from any user groups (e.g., scientists, scholars, students, analysts, administrators, or the general public) and of any level of visualization literacy and skills. The **tasks** concerned can be of any operational needs, such as effective information dissemination, rapid data observation, and explorative information seeking. The **visual representations** concerned can be of elementary encoding (e.g., visual channels, statistical graphics) as well as complex visual mapping (e.g., spatiotemporal data visualization and coordinated multiple views), and can be in visual as well as non-visual forms for enabling visualization via different human sensory devices. The **interaction techniques** can be based on traditional WIMP (windows, icons, menus, and pointers) and direct manipulation. Papers submitted to this area are normally expected to emphasize their novel contributions in terms of design of visual representations and interaction techniques, while the work may also discuss the related hardware and software components for data transformation, image synthesis and displays, interaction, and immersion (see also Areas 3 and 5). Topics of interests include:

- **Visual Channels**: geometric channels (e.g., location, size, orientation, shape, etc.), optical channels (e.g., color, opacity, shading, motion, etc.), topological and relational channels (e.g., connection, overlapping, etc.), and semantic channels (e.g., number, text, glyph, etc.).
- **Visual Representations**: for textual data, tabular data, relational data (e.g., hierarchy, tree, set, graph/network), geospatial data, temporal data, imagery data, geometric data (mesh-, point-, line-, curve-based data), field-based data (e.g., volumetric, vector, and tensor field), corpus data, multi-type data, uncertain and missing data, models, functions, and procedures (e.g., algorithms and software), etc.
- **Interaction Techniques**: UI design for visualization, zoom and navigation, magic lens, query-based exploration, direct manipulation, interactive deformation, interoperation between interaction and visualization tasks, editing tools, collaborative visualization, etc.
- **Visual Communication Techniques**: focus+context design, illustrative and explanatory visualization, stylized visual representations, storytelling and narrative visualization, textual annotation for visualization, etc.
- **Technical Discourses on Visual Representations and Interaction Techniques**: visual and interactional metaphors, scalability of visual mapping, and interaction costs, 2D vs. 3D representations, static vs. animated representations, visualization literacy, etc.

Area 5 (DATAX): Data Transformation, Refinement, Extraction, Augmentation, and Management

This area focuses on the **algorithms and techniques that transform data** from one form to another to enable effective and efficient visual mapping as required by the intended visual representations. In principle, the source and destination data can be of any data types, such as spatial or non-spatial; continue or discrete; statistic, temporal or streaming; numerical, textual or imagery, etc. Such data transformation, which may sometimes be referred to as wrangling or munging in some other fields, may include extracting information from the source data (e.g., surface extraction from volume data, and network construction from textual data), integrating data from different sources (e.g., multi-modality registration), reorganizing data for efficient processing (e.g., hierarchical data representations), enriching data with additional information and functions (e.g., uncertainty analysis and label generation), and improving data quality and usability (e.g., data cleansing). Papers submitted to this area are normally expected to emphasize their novel contributions in terms of the algorithms and techniques for data transformation, while the work may also discuss the intended visual representations and their generation (see also Areas 3 and 4). Topics of of interests include:

- **Information Extraction and Data Abstraction**: keyword extraction, metadata extraction, surface extraction, feature extraction, pattern recognition, structural and semantic analysis, skeletonization, spatial abstraction, topological abstraction, temporal feature tracking, multi-material interfaces, etc.
- **Data Integration**: multi-modality, multi-stage, and multi-level data registration, spatial and non-spatial data integration, multi-field representations, etc.
- **Data Reorganization**: voxelization, triangularization, multi-resolution sampling and representations (e.g., discrete sampling, volumetric lattices, wavelet representations), spatial partitioning (e.g., octree, k-d tree, bounding volume), data segmentation, compressed data representations, frequency-domain representations, databases for query-based visualization, etc.
- **Data Enrichment**: uncertainty analysis, deformable models, label generation, spatialization, etc.
- **Data Improvement**: data cleansing, data editing, data smoothing, and data modelling.
- **Mathematical Frameworks for Data Transformation**: numerical analysis, computational geometry, topological analysis, graph theory, statistical analysis, probability theory, information theory, dimensionality reduction, etc.
- **Technical Discourses on Data Processing and Management in Visualization**: feature specification, data provenance, processing provenance, interactive processing, data synthesis, quality assurance, etc.

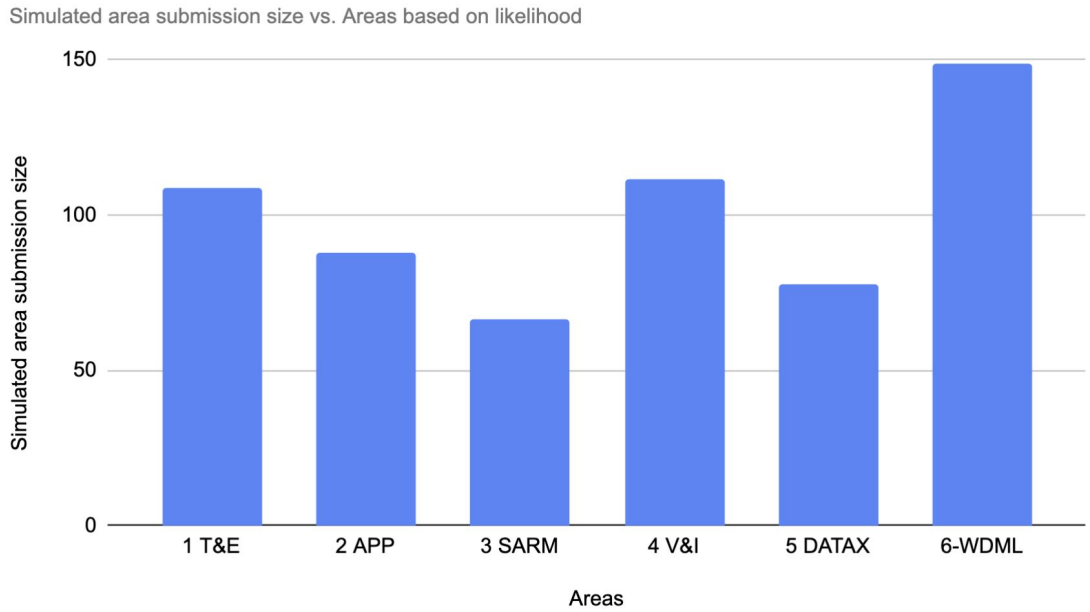
Area 6 (WDML): Integrated Workflows, Decision Support, and Machine Learning

This area focuses on design and optimization of **integrated workflows** for visual data analysis, knowledge discovery, **decision support**, **machine learning**, and other complicated data intelligence tasks. It typically addresses technical problems that cannot be solved using solely machine-centric processes (e.g., statistics and algorithms) or solely human-centric processes (e.g., visualization and interaction). It may also address the need for using interactive visualization to improve the trust, interpretability, understanding of machine-centric processes and their underlying models and need for data intelligence workflows to benefit from theoretical models and empirical findings in cognition, e.g., in areas such as distributed, embodied, and enactive cognition. Hence papers submitted to this area are normally expected to feature an integrated approach. The topics of interest include:

- **Integrated Workflows for Information Seeking, Knowledge Discovery, and Decision Making:** Typical technical problems may include information retrieval, multivariate search, and semantic search; classification, pattern recognition and clustering; similarity, correlation and causality analysis; spatiotemporal tracking and movement analysis; event and sequence analysis; multimedia data analysis; anomaly and change detection; relationship, association, hierarchy, network and structure analysis; intention and behavior analysis; factor analysis and dimensionality reduction; uncertainty and risk analysis; and so on.
- **Integrated Workflows for Machine Learning:** Typical technical problems may include cleaning and labelling training data; assisting active learning or other semi-automated learning methods; facilitating model testing, evaluation and model comparison; supporting the analysis of learned models and learning processes; enabling model understanding, explanation, refinement, and steering; and monitoring the deployment of machine-learned models as well as other machine-centric processes.
- **Workflow Optimization:** techniques, design patterns, and best practices for designing, developing, evaluating, and improving integrated data intelligence workflows. Methods for analysing and alleviating data biases, machine biases, and human biases.
- **Knowledge-assisted Workflows:** knowledge acquisition, mixed initiatives, real-time guidance and recommendation, provenance management and utilization, post-action review, knowledge sharing, and analyst training in visual data analysis.

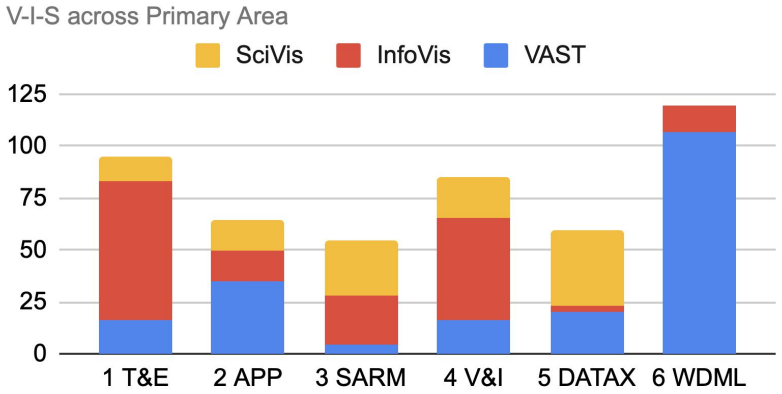
Simulated Area Sizes

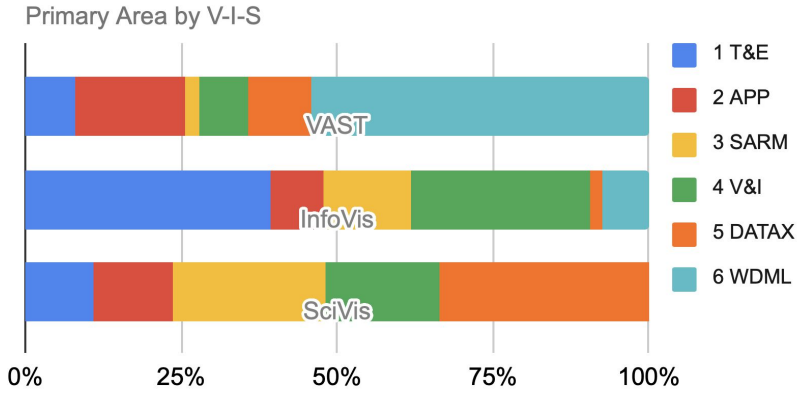
The assessment exercise of coding papers from V-I-S 2017 and 2018 for our final area proposal (2 coders independently deciding the 1 or 2 best fitting areas) provided insight that the submission numbers per area will likely be within the target range.



Relationship Between Areas and V-I-S

The assessment exercise of coding papers also showed that the existing V-I-S papers distribute reasonably well over the areas we developed.





Relationships between Areas and Contributions

	1. T&E	2. APP	3. SARM	4. V&I	5. DATAX	6. WDML
New/Novel or Improved Algorithms	Rare	Possible	Likely	Possible	Likely	Possible
New/Novel Specification for Data Abstraction	Rare	Possible	Rare	Possible	Likely	Possible
New (Open) Datasets	Rare	Rare	Likely	Rare	Rare	Rare
New Deployment	Rare	Likely	Rare	Rare	Rare	Rare
New/Novel or Improved Methodologies	Likely	Rare	Rare	Rare	Rare	Rare
New or Significant Applications	Rare	Likely	Rare	Rare	Rare	Rare
New or Improved Guidelines	Likely	Possible	Rare	Rare	Rare	Rare
New/Novel or Improved Interaction Design	Rare	Possible	Rare	Likely	Rare	Possible
New or Improved Process/Workflow Design	Rare	Possible	Rare	Rare	Rare	Likely
New Systems	Rare	Possible	Likely	Rare	Rare	Rare
New Software Prototypes	Rare	Likely	Likely	Possible	Possible	Possible
New Surveys	Likely	Rare	Rare	Rare	Rare	Rare
New Methodology for Task Abstraction	Likely	Possible	Rare	Possible	Rare	Possible
New or Improved Taxonomies, Models, Frameworks, Theories	Likely	Rare	Rare	Rare	Rare	Ratore
New or Improved Visual Design	Rare	Possible	Rare	Likely	Rare	Possible
New Findings from Computational Benchmark Studies	Possible	Rare	Rare	Rare	Likely	Rare
New Findings from Human-Subjects Qualitative Studies	Likely	Rare	Rare	Rare	Rare	Rare
New Findings from Human-Subjects Quantitative Studies	Likely	Rare	Rare	Rare	Rare	Rare

Design Rationales

- **Needs for Unification.** The evolution of the three conferences, V-I-S, has created some intrinsic and often fuzzy partitions of topics according to some variables (e.g., data types) as well as some observable but seldom-explicit emphases (e.g., visual designs vs. algorithmic solutions vs. integrated workflows). The interaction between these variables and emphases might have skewed or could potentially skew the research on a specific topic towards a certain emphasis (e.g., visual design for tabular data, algorithms for vector fields). Hence an effort of unification may encourage cross-cutting research activities while alleviating the potentials of having silos.
  Remedy: Explicitly broadening the scope of current emphases on designs, algorithms, and workflows in InfoVis, SciVis, and VAST to cover all data types. The broadened areas are Area 4, Area 5, and Area 6 respectively.
- **Encouraging Cross-Cutting Research**. Moving from three conferences to six areas does not remove the hazard of silos, it could just shift the walls to six new and smaller silos.
  Remedy: The mechanism of a unified PC across all areas allows area co-chairs have access to wider expertise than if there were per-area PCs, which would more easily form silos.
- **Size of Each Area and Workload of Area Papers Chairs**. It has been noticed that in recent years, when the number of submissions to a VIS conference reached above a certain level, there were too many borderline papers that require the close attention of papers co-chairs.
  Remedy: Having six areas in an area model will on average halve the number of borderline papers for area papers chairs to handle.
- **New Areas**. There have been concerns that the development of some subject areas in VIS might be disadvantaged by the current system of three conferences. One could anticipate that creating a new area would be easier than creating a conference.
  Remedy: Having an area model for the unified VIS conference, and having a special committee to review the area model, and when appropriate, to create, split, merge, or remove areas (see also the recommended governance model).

Rationale: Existing Topics and Possible Future Areas (I)

- **Area 1 and Empirical Research.** Papers on empirical studies are currently distributed throughout V-I-S but reviewer expertise is unevenly distributed. Having a focused area enables a coherent and broad research agenda that may help stimulate more researchers to work in this area, and concentrating them will allow APCs with appropriate expertise to make scientific judgements about them.
- **Area 1 and Theoretical Research.** There are typically about 5 theoretical papers accepted each year, hence, just theoretical papers are too small to form a separate area. Considering the wide range of topics in this area and the aspiration shown by VIS researchers to develop the foundations of visualization, we anticipate that this area may grow in the coming years. Among all areas, theoretical papers seem to fit best with empirical research, as both strive to strengthen the foundation on which we build visualization.
- **Area 2 and Applications.** Design studies and application-focused work are also currently distributed throughout V-I-S. Having an area focused on this research agenda, in conjunction with the new keywords that support fine-grained contribution claims, will help encourage the work itself and also appropriate reviewing of it.
- **Area 3 and Display Techniques.** This area includes a number of topics (e.g., HPC, VR, Mobile, languages & toolkits), each of which typically attracts 1~5 papers. Bring these topics together may alleviate a sense of “outsider” by the authors, and may stimulate more and stronger contributions towards systems, open data and open source. In addition, by the term “Display Techniques” we include all kinds of techniques and algorithms related to rendering, considering it broadly to include any “drawing” techniques, such as graph layout, stereo image synthesis, 3D printing for physical visualization, volume visualization, and so on. Semantically, this topic is closer to system-related topics than to the algorithms and techniques for data transformation and information extraction (Area 5). Having it in Area 3 also helps increase the size of Area 3 to a “safer” level.
- **Area 3 and Large Data Analysis and Visualization (LDAV).** There was a question whether or not more papers on topics featured at LDAV could be welcomed in the main VIS tracks. We hope that the introduction of Area 3 will enable authors of such papers to find a home for submission.

Rationale: Existing Topics and Possible Future Areas (II)

- **Area 4 and Interaction Techniques.** Some early discussions indicated that there might be a desire among researchers for having this as a separate area. It is estimated that there are currently about 5+ papers in the area each year, and it is too small to form a separate area. This topic is part of Area 4 in this area model. We anticipate that the number of papers on interaction techniques may grow in the coming years.
- **Area 4 and Storytelling Visualization.** There is an increasing number of papers submitted and accepted on this topic. There was a suggestion that this topic may be included in Area 2 by considering storytelling as a type of application (visualization for the masses). On balance, it is perhaps more appropriate to consider this as part of a collection of visualization techniques for communication and dissemination purposes and they need specialized visual designs and interaction designs. We have thus kept this topic in Area 4, together with some related topics such as illustrative and explanatory visualization.
- **Area 6 and Visual Data Science.** There was a question whether or not more papers on topics featured in VDS could be welcomed in the main VIS tracks. The committee noticed that there were already three ML sessions in VIS2018, and concluded that the topics of VDS had been reasonably well-covered by VIS conferences. This leads to a related question as to whether or not machine learning and AI should have a separate area by splitting Area 6.
- **Area 6: Splitting or Not?** The committee spent a fair amount of time discussing the two options, partly because the estimated number of papers in Area 6 is higher than the numbers in other areas. After several attempts, the committee still had difficulties to define two separate areas, as any kind of splitting would appear to be in conflict with the emphasis on integration in Area 6. Meanwhile, the coding of VIS2017 and VIS2018 papers based on two areas (one technical, one focusing on workflows) also showed noticeable imbalance in terms of the sizes of the two areas. Hence the committee decided not to split Area 6, but anticipate that this will be reviewed by the future committee responsible for revising the Area Model for the VIS conference.

Scenarios

With the new area model, for some papers (e.g., theory, empirical studies, VR/AR), it will likely be easier to choose an area than choosing one of the three conferences currently. For some papers focusing on a specific data type, the authors may initially feel uncertain about where it will go because the "perceived" spatial and non-spatial separation between SciVis and InfoVis/VAST will disappear. For example:

Q: I have a paper on "using glyphs in feature-based multi-field flow visualization", where should I submit?

A: If you believe that the paper has stronger novel contributions in glyph design, submit it to Area 4, possibly with a secondary Area 5. If it has stronger novel contributions in feature specification or feature extraction methods, submit it to Area 5, with a secondary Area 4.

Because there will be six areas (instead of three conferences), authors may also have more options to choose an area best reflecting its novel contributions.

Q: I have a paper on detecting anomalies in social media data, and I would normally submit to VAST, where should I submit?

A: You may choose Area 6 if the strongest contribution is about an integrated workflow and optimized use of machine- and human-centric processes, Area 2 if the strongest contribution is about delivering an effective solution to a group of domain experts, Area 4 if the strongest contribution is about the novel visual designs and interaction designs, Area 5 if the strongest contribution is about algorithms and techniques for extracting information from social media data, or specify a secondary area if there are two types of strong contributions.

Note that in all of these cases, area paper chairs can draw on the expertise of the unified program committee. I.e., for truly inter-area papers, area paper chairs can recruit the right expertise beyond the boundaries of a single V-I-S committee.

More detailed guidance to PC members and reviewers will be necessary. In addition to the descriptions of the areas, the new call for papers will need to feature many examples of how past papers could fit into the new area model (and also the new keyword model). The reVISe committee has not yet created all of these materials.

Governance

Proposed Structure

- **Visualization Council**
  Long term strategic and policy matters; ratification of specified VEC appointments and decisions; ratification of area model evolution.
- **Visualization Executive Committee (VEC2)**
  Operational, multi-year aspects of the conference and the executive organization.
- **Paper Chairs Committee**
  Scientific content, reviewing process and program.
- **Area Curation Committee**
  Monitoring of areas and related topics such as keywords, proposing area-related motions to Visualization Council.
- **Organizing Committee**
  Practical arrangements of one conference instance.
- **Unified Program Committee**
  Reviewing process.

Overall Considerations

- **Long-term governance** of a growing visualization community and its annual international meeting
- **Unification of subfields** to break down barriers and avoid creation of “silos” with respect to:
  - Scientific content
  - Administration
  - Reviewing
  - External communication
- **Distribution of management workload** across several bodies
- **Transparency** in appointment and decision making
- Increased **turnover** in governance
- Foster **engagement** between community and governing bodies
- Increase **representation** in governance across community (introduce mix of elected and appointed positions)

High-Level Principles

- **Delegation of Scientific Trust**
  Visualization Council → VEC2 → Paper Chairs Committee → Unified Program Committee.

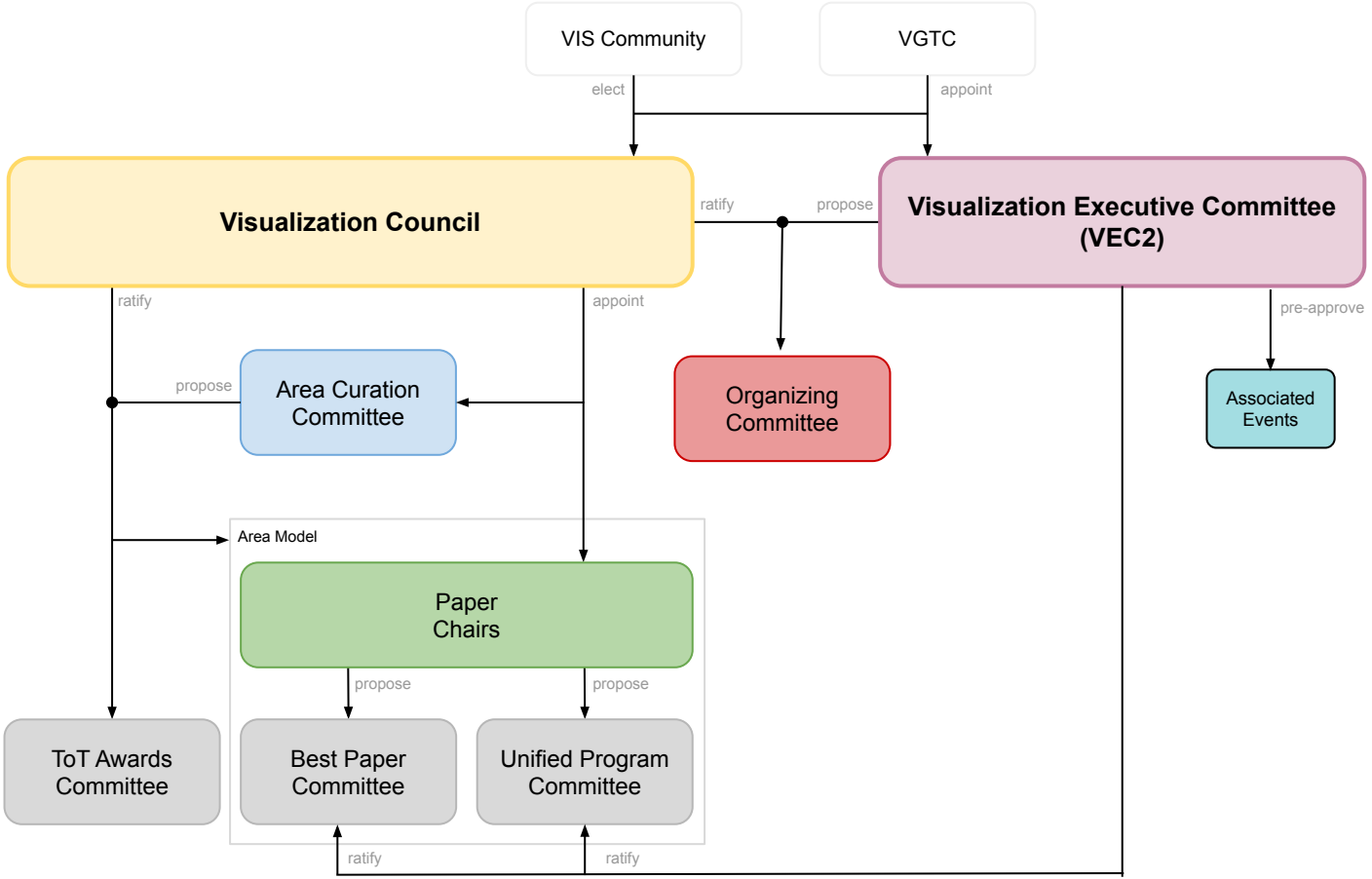
- **Structure Follows Scholarship**
  Data-driven decision making and appointments (publication / contribution history) at all levels:
  Visualization Council, VEC2, Area Curation Committee, Organizing Committee, Papers Chairs Committee, Program Committee.

- **Firewall between Governance and Content**
  Avoid inappropriate special treatment – or perception thereof – of papers submissions from governance members.

- **Turnover and Representation**
  Ensure that community is involved and engaged in governance through elected members and term limits; provide opportunities for community members to grow into positions of authority; ensure representation across all of VIS.

- **Nurturing Vibrant Community**
  Soliciting feedback before making appointment decisions; mentoring new committee members and thanking outgoing, proactively communicating about eligibility and consideration for higher-responsibility roles

High-Level Overview



Evolutionary View

V-I-S Steering Committees → Visualization Council

- governance and oversight across the entire conference, “highest”-level committee
- executive responsibilities transferred to VEC2
- obviates replication of similar tasks and cross-SC coordination
- needs fewer members than direct combination of V-I-S SCs

VEC → VEC2

- take over executive responsibility from V-I-S SCs
- scientific responsibilities transferred to Visualization Council
- (name of VEC2 for disambiguation in these slides, name would stay the same)

V-I-S Papers Chairs → Paper Chairs Committee (APCs + OPCs)

- 12 APCs for six (smaller) areas instead of 9 paper chairs for V-I-S “historic” areas
- 2 OPCs for running overall papers process, standardization, assistance, and oversight

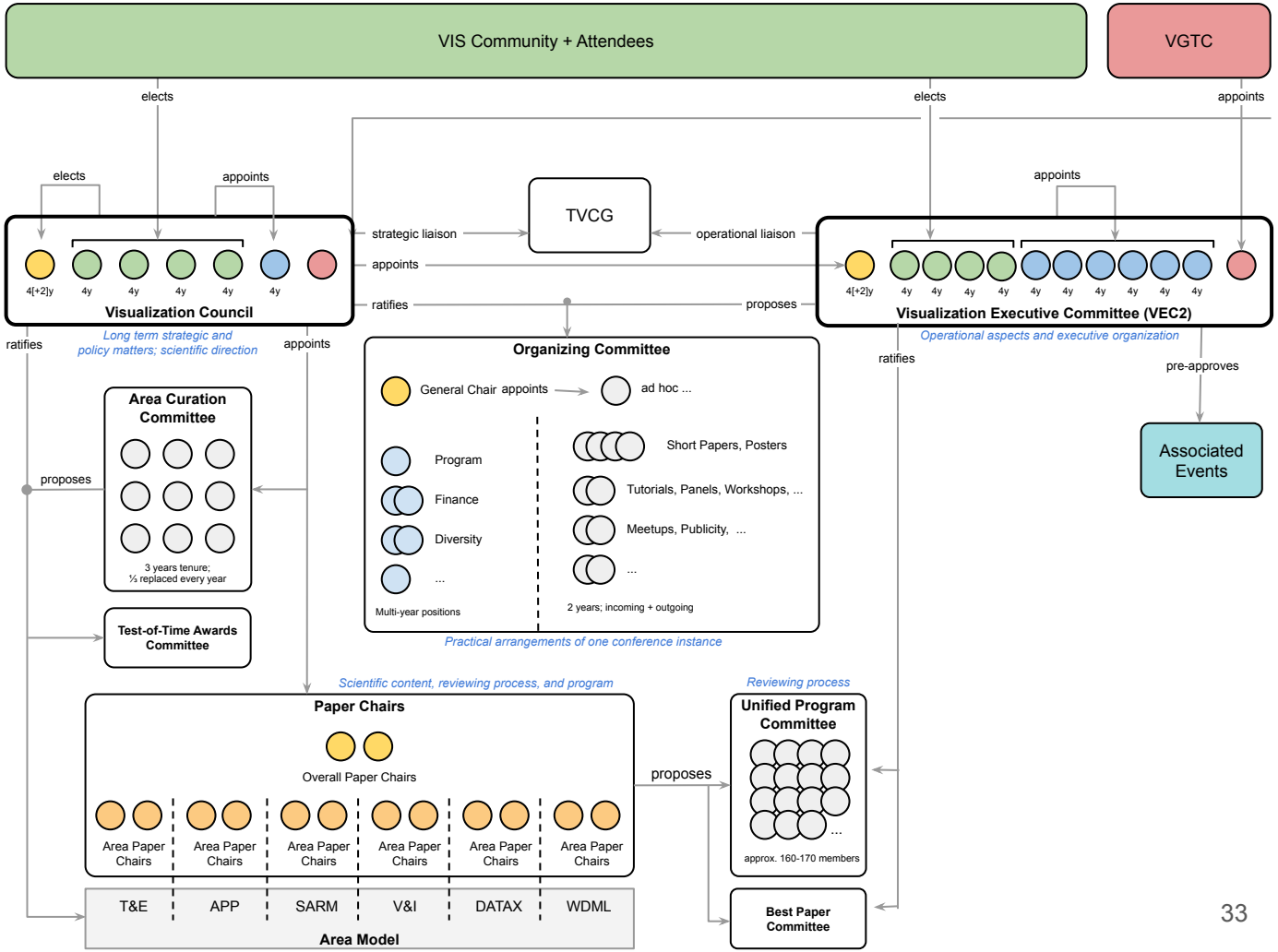
V-I-S Program Committees → Unified Program Committee

- allow PC members to apply cross-area expertise
- reduce individual workload and facilitate term limits, while preserving process quality

NEW: Area Chairs Committee

- area model evolution not easily attached to one of the above committees

Proposed Structure



Visualization Council: Scope

- All cross-year policy questions (e.g. open access, reviewing model, etc.); general oversight
- Appointment of VEC2 chair
- Appointment of Paper Chairs Committee
- Ratification of (some) VEC2 appointment proposals
- Appointment of Area Curation Committee members and ratification of area evolution proposals.
- Strategic relationship with journals (TVCG, CG&A, …)
- Ratification of future General Chair and conference location, based on recommendation from the VEC2

Visualization Council: Structure

Roles: 7 members

- **Chair**
  4-year term (extendable to second 2-year term), appointed by vote of Visualization Council members
- 1 member appointed by VGTC chair (could be VGTC chair; may change with new chair)
- 1 member appointed by Visualization Council
  4 year term
- 4 members elected by VIS attendees & community
  4 year term (1 elected each year)

Criteria

Longstanding and continuing active contribution to VIS; outstanding proven track record as responsive and engaged organizer; overall mix of research areas/topics, academic lineage, gender, geography, sector; willingness and follow through with attending multiple meetings per year.

Council members may not serve on VEC2 or Area Curation Committee during their term. This restriction also applies to VGTC Chair, who can personally serve only on either the council or the VEC. Repeat appointments are possible following a four-year break.

Visualization Executive Committee (VEC2): Scope

- Many OC appointments (except for overall/area papers chairs):
  - Proposed by VEC2, ratified by Visualization Council
- Pre-approval of associated events (all symposia, some workshops)
- Approval of **unified program committee** and **best paper committee** proposed by papers chairs
- Operational relationship with journals (TVCG, CG&A, …)
- Recommendation of future General Chair and location to Visualization Council
- Liaison with Associated Events (annual meeting)
- Multi-year operational aspects of VIS (finance, web, etc.)

VEC2: Structure

Roles: 12 members

- **VEC Chair**
  4-year term (extendable to second 2-year term), appointed by Visualization Council
- **1 appointed Member at Large**
  appointed by VGTC Chair
  (may change with new Chair)
- **4 elected Members at Large**
  4-year term, elected by VIS attendees & community
- **6 members**
  4-year term, appointed by current members

Rationale: In contrast to the council, VEC2 is predominantly appointed (as opposed to elected). This reflects the operational nature of VEC2, where an established track record to follow through with tasks is critical.

Criteria for all VEC members:

Longstanding and continuing active contribution to VIS (participant for 6 years, 2 years of OC service or equiv.); proven track record as responsive and engaged organizer; overall mix of research areas/topics, academic lineage, gender, geography, sector; willingness and follow through with attending multiple meetings per year; in person at VIS (3x / week), and teleconference in between (4-6x / year).

VEC2 members may not serve on Visualization Council or Area Curation Committee during their term; also applies to VGTC chair, who can serve at most on one. Repeat appointments are possible, with substantial breaks in between (equal to term limit).

Area Curation Committee (ACC)

Roles: 9 members, appointed by Visualization Council for 3-year terms

- large enough to represent scientific breadth, emerging areas, and competence from adjacent communities well
- 3 members rotate on/off each year; agree on chair among themselves

Scope:

- Continues with (a specific subset of) work that reVISe has started
- Responsible for intellectual work of determining areas,
  - driven by both ongoing data analysis and strategic concerns,
  - within initial framework set up by reVISe: areas need to split/merge if below min / above max, for several years in a row.
- Proposes Test of Time Awards committee, ratified by Visualization Council
- Liaison with Associated Events (annual meeting)

Criteria:

Long-term and continuing active contribution to VIS; proven track record as responsive and engaged organizer; overall mix of research areas/topics, academic lineage, gender, geography.

Area Curation Committee members may not serve on Visualization Council or VEC2 during their term; repeat appointments are possible, with substantial breaks in between (equal to term limit).

ACC Rationale

- Important to have dedicated committee responsible for conducting data analysis every year, even though the expectation is that proposals for change would not be expected to come every year. Multi-year data analyses of submission patterns allow this group to understand and react to changing trends in the community, culminating in proposals to adjust areas as part of an established conference organization process. Structurally it's crucial that areas would change as part of the normal process rather than requiring specific effort to do something special.

- The question of appropriate min/max ranges of how many papers could be submitted per area before merging or splitting should take place, is also tricky. It's important to have clear rules to avoid political turmoil as areas grow and shrink, such as "merge into another area if fewer than X papers after Y years in a row". However, don't want to penalize success by requiring involuntary splitting if healthy growth occurs, or to require merges/splits that mangle intellectual coherence within an area.

- Important to have a process featuring scientific judgement and data-driven decision making, in the context of clear rules, so as to minimize biases and politics ("power-plays") that could lead to areas that do not accurately reflect the topics and people at the conference.

Organizing Committee (OC): Structure

Roles:

Appointed by Visualization Council

- **2 overall paper chairs**
  (typically area papers chairs in the past)
- **2 area paper chairs** per area

Proposed by VEC2, ratified by Visualization Council

- 6 poster chairs / 4 short paper chairs
- 2 chairs each for panels, tutorials, workshops, doctoral colloquium, meetups, publicity, video previews/fast forwards, VISKids, diversity, arts program
  - ideally, one incoming and one outgoing chair
- Multi-year positions: program, finance, webmasters, archive, …
- 2 elections chairs (new role)

Proposed by previous chairs, approved by General Chair

- Student volunteers
- VAST Challenge
- SciVis Contest

Appointed by General Chair

- 3rd supporters chair
- Specialty/ad hoc chairs

Others

- VEC2 Chair (appointed by Council)
- Subsequent General Chairs (for upcoming years)

Papers Chairs Committee

Two-tier structure: 2 overall papers chairs (OPCs) + 2 area papers chairs (APCs) per area

- All appointed by Visualization Council
- Propose Best Paper Committee
- Propose Unified Program Committee
- All are guest editors of the TVCG special issue.

OPCs manage papers process in the large (timeline, PCS operation, session planning, preface, etc.), provide assistance and oversight, and ensure consistency across areas. They are resource for APCs with questions about plagiarism, conflicts, etc. OPCs are also responsible for integrating APC materials into unified call for papers, for which they have final approval (not VEC2).

Selection criteria:

- APC: similar to current V-I-S paper chairs

  Criteria: research excellence and impact; excellent service record as thoughtful reviewer on PC; proven responsibility through previous OC jobs or equiv. experience; mix of lineages, research areas, demographics (geography, sector, gender). At least one APC should be at a career stage typically expected for TVCG Associate Editors (post-tenure and h-index of 20+).

  Cannot be APC for multiple areas at once; break before becoming APC again (2 years typical / max., 1 year break).

  Two chairs in same area cannot be conflicted, including no co-authored publications in past 5 years.

- OPC:

  Criteria: Balance of research areas for current pair, and appropriate mix of research areas over larger time window. Should have experience as APC, with outstanding performance (after bootstrap phase). At least one OPC must have experience as TVCG Associate Editor (or equivalent experience at a commensurate journal).

  OPC cannot also be APC in same year;
  OPC cannot be reappointed after term (2 years typical/max.)

  Two chairs in same area cannot be conflicted, including no co-authored publications in past 5 years.

Unified Program Committee

Approx. 160-170 members

- Proposed by combination of all APCs and OPCs, ratified by VEC2
- Number of members decided by ambition to have 5-7 papers per committee members
- Assume estimated submission count is N=400-500, so need PC of ~160-170
- For each area (currently 6 proposed): each pair of APCs proposes a list of roughly 30 names intended to ensure good coverage of research areas within their scope
- OPCs are responsible for merging lists and considering overall balance, may remove some names and may propose additional names of their own. OPCs make final decisions.
- Ensure good mix across research areas, sub-areas, and consider usual standard selection criteria (demographic mix of: gender, geography, sector, academic lineage; contribution record as author and reviewer).
- Same term limits as current: 3 years on, 1 year off
    - Stronger policy, since UPC members cannot jump to other PCs as people do now.
    - May result in better supply of externals

Test of Time Awards Committee

- ToT committee members proposed by area curation committee annually, after consideration of conflicts of interest from authors of potentially eligible papers for that year, and those appointments are ratified by the Council. ToT committee is considered part of the OC for that year.
- Continue with current mission: recognize articles published at previous conferences whose contents are still vibrant and useful today and have had a major impact and influence within and beyond the visualization community.
    - Encourage researchers to aim to produce work that is forward looking and has transformational potential.
    - Make participants aspire to write the papers that will be relevant in 10 and 20 years.
    - Selection: The decisions are based on objective measures such as the numbers of citations, and more subjective ones such as the quality and longevity and influence of ideas, outreach, uptake and effect not only in the research community, but also within application domains and visualization practice.

For the foreseeable future: keep separate ToT awards for V-I-S (until awarding for the year that reunification occurred).

- VAST is 10 years prior, InfoVis is 10+20 years prior, SciVis is 15+25 years prior

Ratification

VEC2 proposes most OC positions and content chairs (short papers / posters / tutorials / workshops / etc), ratified by Visualization Council. Rationale:

- Oversight committee (Council) has ultimate authority to safeguard adherence to (well-documented) selection and diversity criteria.
- Ratification should be largely automatic if proposed roster follows criteria.
- Ratification also relies on communication and dialogue between council and proposing body.

Area Curation Committee makes proposals for changes to areas or keywords, ratified by Visualization Council. Rationale:

- Ratification allows scientific oversight for fundamental structure of conference content.
- Ensures time for reflection for important strategy decisions.

Papers Chairs Committee proposes unified program committee and best papers committees, ratified by VEC. Rationale:

- Oversight committee (VEC) is keeper of institutional memory about past reviewer performance issues not available to this year's papers chairs.
- Oversight committee has ultimate authority to safeguard adherence to (well-documented) selection and diversity criteria.

Associated Events

New mandate for VEC2 and Area Curation Committee:

- Each will conduct an annual meeting with Associated Events (AE) representatives
  - One representative per AE, either organizer or steering

Rationale:

- Provide a systematic way for Associated Events to voice concerns and/or suggest new ideas, regarding both scientific content and governance.
- Lubricate flow of information to / from Associated Events, e.g. about
  - sponsoring opportunities / expectations
  - publication models
- Identify opportunities for growth of Associated Events topics/concerns in the main conference.

Elected Positions

Principle: strike balance between openness of elections and operational effectiveness of committees.

Who can vote?

- “Community”: VIS attendee or contributor in past 3 years (including current).

Who can run for VEC2?

- “Community”: VIS attendee or contributor in past 3 years (including current).
- Same criteria as all VEC members: Minimum of experience in VIS organization (normally six years of participation in VIS, and two years of OC role or equivalent organizational / executive experience).

Who can run for Visualization Council?

- “Community”: VIS attendee or contributor in past 3 years (including current).
- Same criteria as all Council members: High scientific standing and experience with scientific leadership in the visualization community.

Formal vetting by VEC2

- Check only minimal formal requirements, term limits; can only run for either of VEC2 or Council in any given election
- Rejected candidates can request formal rationale, and can decide whether to keep private or make public

Elected Positions – Possible Timeline

May 1	VEC2 announces positions (VEC2 and Council) becoming vacant and puts out call for nominations. ● Open and community-wide; announcement to ieee-vis mailing list and ieeevis.org ● Nomination to include brief statement on qualification and goals. ● Self-nominations possible (and possibly the norm).
Jun 1	Call for nominations closes; VEC2 begins vetting nominees. ● Only check minimal / formal requirements.
Jul 1	VEC2 announces vetting results to nominees. ● In case of negative vetting, candidates can request a formal statement with rejection rationale.
Aug 1	VEC2 announces vetting result and final list of candidates for each position; as well as general voting info ● Rejected nominees can request inclusion of vetting rationale statement, default is to not include it. ● Announcement to ieee-vis mailing list and ieeevis.org
Sep 1 – one week before VIS	Voting
VIS	Announcement of election results; start of electees' terms.

Elected Positions – Procedure

Voting procedure (conducted by OC, ideally supported by new Elections Chair role within OC):

Voters: Attendees and contributors of past three years, automatically registered as voters by OC

For each of VEC2 and Visualization Council: Instant Run-Off Voting using partial preferential voting.

- https://en.wikipedia.org/wiki/Instant-runoff_voting

Could be realized through readily available third party / commercial web-based service, under direction of OC.

Corner cases:

- N candidates for N positions in a category → election not needed

- Not enough candidates
  - committee may nominate (could always but should not be the norm) and extends the nomination period
  - if still not enough candidates, committee (including current elected members) can appoint members without election

Principles: Structure Follows Scholarship

Principle: Data-driven decision making

- Cross-check publication / contribution history to ensure active participants are not missed just because they're not in lineage of (or on radar of) current Council / VEC members.
    - At all levels: UPC, OC, PCC (OPCs and APCs), ACC, VEC, Council
- Solicit feedback from outgoing papers chairs about reviewer performance:
    - Identify outstanding reviewers as part of considering new OC candidates
    - Identify problematic ones to have institutional memory that lasts beyond short handoff window between chairs.

Rationale: consulting records as a path to avoid actual (or perceived) bias

- Considerable judgement is involved, it's not just checking sorted lists - but consulting those lists should be an important part of the process
- Crucial that community perceives process as 'structure follows scholarship', without favoritism involving academic lineages or research areas.
    - Tricky: confidential information on performance as organizer not visible to community

Principles: Structure Follows Scholarship

Principle: Explicit selection criteria important for transparency and accountability

- Major metrics: record as contributor & organizer, both long term and recent (ensure active people have a voice)
- Ensure diverse mix of
  - academic lineages
  - research topics and sub-topics
  - gender
  - sector (academia, industry, govt)
  - geography (proportional to research activity in major regions)
- Job-specific criteria for different contributor roles
  - Papers: record as author & reviewer
  - VIP: industry engagement
  - Doctoral Colloquium:
    academic experience (rather than e.g. research or government lab roles)
  - VEC2: typically outstanding service as papers chair or equivalent major organizer role
  - Panels: experience as panelist and/or panel organizer
  - Workshops: experience as workshop organizer
  - Tutorials: experience as tutorial organizer
- Cannot serve on multiple committees simultaneously: only one of VEC2, Council, ACC

Principles: Firewall between Governance & Content

Principle: There must be an absolute wall between papers chair decisions and steering committees (VEC2 and Council)

- Avoid the perception (or actuality) of inappropriate special treatment of papers submissions from steering members

New two-tier papers chair structure moves some responsibilities from steering to new overall papers chairs:

- CFP now done by overall papers chairs (OPCs), not VEC2
- OPCs responsible for ensuring consistency across APCs for policy questions and acceptance rates, also resource for handling conflicts of interest

Principles: Turnover and Representation

Principle: Ensure that VIS community is involved and engaged in governance.

- Strong term limits for most positions; importantly for Visualization Council, VEC2, ACC, and Paper Chairs
  - Chosen to balance effectiveness of committee members (after learning period) against turnover.
  - Breaks mandated between repeated appointments to many positions.

- Elected positions in Visualization Council (4) and VEC2 (2)
  - Ensure that community has a voice in governance.

- Representation across all of VIS
  - Research topics and sub-topics are an explicit criterion when considering diversity in representation.
  - Ensure systematic interaction of Associated Events with governance

- Provide opportunities for community members to grow into positions of authority

Ensure that community is involved and engaged in governance, through elected members and term limits; provide opportunities for community members to grow into positions of authority; ensure representation across all of VIS.

Principles: Delegation of Scientific Trust

Principle: Responsibilities are delegated to groups vested with specific levels of power and autonomy; oversight is retained to ensure guiding principles are being followed

- One advantage of separation between bodies that propose vs ratify is that it provides a system of checks and balances: trust, but verify. One disadvantage is that it adds friction and delays to decision-making processes, and could lead to duplication of adjudication effort. Our design goal is to find the right sweet spot in this trade-off.

- Scientific decision-making about content affects the careers and lives of VIS participants, and needs to be handled with due care and attention.

- Autonomy and authority are important for roles to be satisfying and rewarding, a relevant consideration in volunteer service roles.

Principles: Nurturing Vibrant Community

Principle: Keeping community vibrant requires considerable bidirectional communication between organizers and steering

- Soliciting feedback on current OC member performance in advance of generating new OC roster
- Mentoring/onboarding new OC members
- Thanking outgoing OC for service
- Maintaining "on deck" lists of OC members who rotate out after strong work
    - Tricky: fewer papers chair slots than OC slots, "apex of pyramid" situation. Active communication for managing expectations is important.
    - Want shared understanding that being a contender for higher-responsibility slots like papers chairs does not require continuous / endless OC service; this is important to communicate to people when outgoing if they're on deck.
    - Consider which former papers chairs are contenders for later VEC2 membership

Papers Review

Rationale

- Our area model has two papers chairs per area plus two overall papers chairs. A large unified PC avoids many of the problems of too-small per-area PCs, and also avoids balkanization and silos: there would be maximum availability of reviewer expertise across all areas. The subdivision of papers into smaller pools, each in the purview of two area papers chairs who oversee reviewer assignment and resolve all the borderline cases using in depth knowledge of their area, is a scalable solution that accommodates growth and dynamism with pools of manageable size. The authors would choose which area to submit to themselves, for full process transparency. In this model, areas do matter since papers chairs are assigned this way, but they are not nearly as high stakes as with separate PCs per area - avoiding artificial bubbles. With one big PC, we don't rip down old walls only to use those bricks to build new walls. The new keywords (see later slides) will help in assigning PC members with the right expertise across one large PC.

Papers Review Process

1. All reviewers declare expertise with new reVISe keywords.
2. Bidding process also uses new keywords set, same time period as current.
    - Tooling change: so that unified PC members only deal with a manageable number of abstracts, PCS provides ability to filter abstracts in/out according to keywords, so they can mark many of them unsuitable without careful scrutiny.
    - Content change: new keywords provide better coverage/matchability than previous set.
3. APCs assign 2 PC members (primary & secondary) to each submission in their area.
    - Can draw anybody from entire unified PC.
    - Will require multiple iterations across areas for load balancing. Assignment meeting needs to include all papers chairs at once, with pairs working closely together and periodic synchronization across areas. Overall papers chairs help adjudicate between area papers chairs with competing interests.
4. Keep current protocol: Primary and secondary assign one external reviewer each, all four write reviews (Pri, Sec, 2xExt), primary writes summary meta-review.
5. Area papers chairs make decisions for each submission in their area, potentially in consultation with OPCs for borderline cases. The OPCs will work with APCs to arrive at similar acceptance rates across areas and an overall acceptance rate that leads to a vibrant program, maintains research quality, ensures stability of the conference, and complies with TVCG requirements and practice.

Papers Review Process (cont'd)

Conflicts of interest

- Area paper chairs are barred from submitting to their own area.
- Rationale: our coding revealed that most papers can easily find a secondary area and a unified PC ensures that expertise to review a paper will be available also outside of its primary area (see slide Alternatives Considered: Conflict of Interest).

Endgame

- OPCs can see everything: all reviews & papers (except their own submissions).
- APCs can only see materials for their own area.
- APCs should (roughly) stay within acceptance rate bounds.
- OPCs will see batches of proposals from APCs.
    - Just like AEICs and EIC from TVCG in current approval process

Papers Review Process (cont'd)

Multiple areas

- Areas are designed to provide authors with choices, but authors do need to select primary area.
    - Principle: any paper is handled by only one set of APCs for reviewer selection and final decision making. Keep complexity under control by minimizing inter-APC adjudication.
- If authors select both primary and secondary area, before reviewers are assigned, APCs (both sets) will liaise to decide whether to leave in primary area or move to secondary area.
- If APCs feel strongly that a paper is in the wrong area (or both are conflicted), they can liaise with other APCs to propose a move.
    - Only for very small number of papers each year – exceptional, not the common case.

Best Papers Process

Principle: award “best” papers while accounting for inhomogeneous paper and reviewing landscape.

- Two-tier structure with best papers and honorable mentions, like now. Difference is multiple winners for both.
- Seminal contributions, considered relative to typical level of contribution within area, to account for differences in reviewing across topics / contributions / areas.
- Awards should not be explicitly linked to areas, although nomination procedure involves them.

Best Paper Committee

- Separate committee that is proposed by OPCs + APCs, ratified by VEC2

Award Procedure

- CHI-style percentage model where fixed percentage of all papers get award (1% best, 5% honorable)
- Nominations flow up from area to committee: APCs nominate papers for their area, up to max number determined by relative proportion of submissions to that area with respect to total submissions. Informed by checkbox on reviewing form so nominations solicited from PC members, but APCs augment and refine with global perspective.
- APCs cannot nominate their own papers (by definition, since cannot submit to own areas).

Keywords

Introduction

The following slides discuss a new set of keywords we propose to use during the paper submission and bidding process for IEEE VIS. We specifically propose to replace the current set of PCS keywords with this new set.

Overall Motivation

During the course of the committee's work on a new area model, thinking about keywords became necessary; in part to inform the committee's recommendations for new areas but also to support better paper matching in the currently proposed model with one large PC across all areas. In particular, we want to achieve:

- A continued high quality of reviews in the new area model by supporting:
  - Area paper chairs in assigning reviewers
  - PC members in giving input on which papers/topics they have expertise about
  - Paper authors in giving input on the expertise needed to judge their paper

→ An improved set of keywords can greatly reduce the effort of bidding, support author input, and ultimately improve assignments across areas → **expertise-driven reviewing**

History and Data

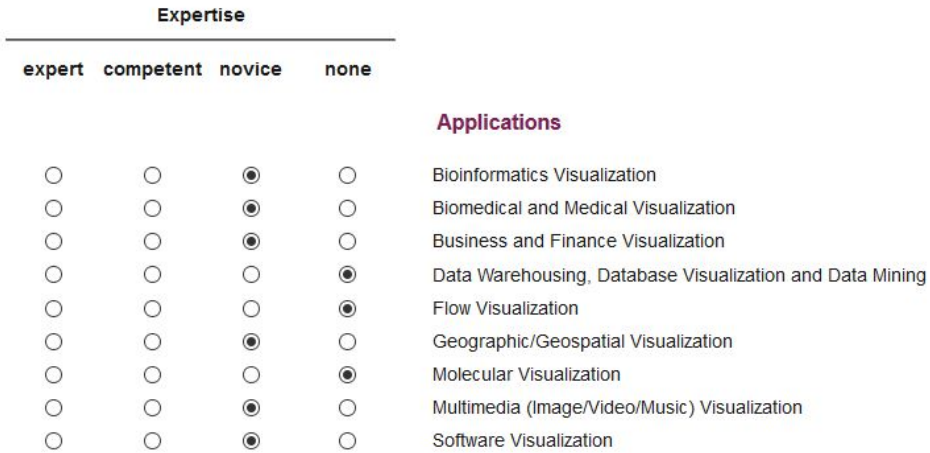
- In 2018 VIS experimented with a matching score calculated from example papers. Data analysis for InfoVis and informal feedback received revealed no correlation between these new matching scores and bids. And, thus, uploading sample papers did not support a better matching during bidding or while finding reviewers. See here for the full analysis: https://docs.google.com/presentation/d/1hGrJsGh_9pw1RaDqgOUJWJr60RYjqJHB7skJj6IuHsk/edit#slide=id.p

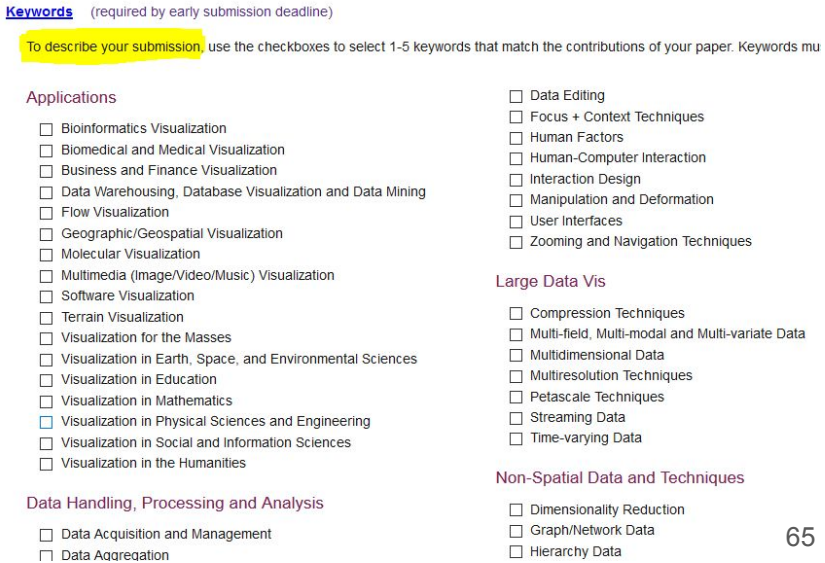
- In 2019 VIS went back to implementing keywords in the submission system to support bidding and reviewer matching. While no dedicated analysis was done, informal feedback from the PC (InfoVis) was positive in comparison to 2018. Keywords did support better matching.

Current State of PCS Keywords

Keywords are used for two purposes:

- For reviewers & PC members to rate their expertise (left figure)
- For authors to indicate the content of their paper (right figure)





Current State of PCS Keywords

The current set of PCS keywords includes 127 keywords across the following 14 categories:

Short Code	Higher-Level Keyword
Theory	Theory of Visual Data Analysis
Analysis	Visual Analysis and Knowledge Discovery
Data	Data Handling, Processing and Analysis
NonSpatial	Non-Spatial Data and Techniques
Spatial	Spatial Data and Techniques
Interaction	Interaction Techniques
Display	Display and Interaction Technology
Evaluation	Evaluation
PerCog	Perception & Cognition
Hardware	Hardware Acceleration
Large	Large Data Vis
General	General Topics and Techniques
Applications	Applications
VAST	Visual Analytics Applications

High-Level Principles

- Keyword Collection
  - Improve the distinction and balance between **keyword types**: technique/topic, contribution, application, and data-related keywords
  - **Collapse** under-used keywords, **expand** keywords that were too broad
  - Include keywords that **cover** all current V-I-S areas
- Keyword Usage
  - Ask authors to specifically check keywords to mark **expertise** required for their paper, rather than checking boxes to *describe* a paper
    - The author version of the keyword rating page should include the description “A reviewer judging your work should have expertise related to... :
    - The reviewer version of the keyword page should include the description “I have the following level of expertise related to…”
- Keyword Usability
  - Add clear **descriptions** for each proposed keyword
  - Add **example** keyword selections
  - Add the possibility to check “**other**” and provide suggestion – to collect data for future refinement of keywords and capture potentially emerging required expertise that doesn’t yet fit
- Keyword Counts
  - Encourage multiple choices for each keyword type (when appropriate), rather than previous limit of four total

Overall Considerations

- Keywords are meant to express **expertise required** for most papers and the **expertise** of most reviewers at IEEE VIS and are NOT meant as a taxonomy of visualization as a field

- Similar keywords should appear only in one category
  (*e.g. graphs/networks/trees is grouped under "data type" and there is no additional graphs/networks/trees keyword under "topics"*)

- Compound keywords are only present if they cannot be expressed by checking multiple existing keywords
  (e.g. spatiotemporal data can be expressed by checking "geospatial data" and "time varying data" and is not included separately)

- Keyword categories chosen to be cross-cutting facets

Process of Deriving New Keyword Set

Starting in March/April 2019 the committee began to assess keywords from the following sources:

- The current set of PCS keywords
- Author keywords used on IEEE VIS papers
- The coded author keywords from the keyvis project (http://www.keyvis.org)
- Topic modeling from visualization papers
- Simple text extraction (bigrams)
- Visualization literature (Shneiderman data type taxonomy, Lee et al.'s Contribution types, Munzner's textbook, …)

We grouped keywords and assessed their frequency. We then removed keywords that were too infrequent, joined similar keywords, and grouped them into categories. We iteratively refined the categorization through active coding of papers and session titles and extensive discussion. After converging, we set up two questionnaires in which participants from our labs simulated rating their expertise using an early version of the keyword set. We made modification based on feedback received and eventually deployed two questionnaires to the community to collect broader feedback. These two questionnaires can be accessed here until October 25, 2019: **https://www.soscisurvey.de/reVISeAuthor/** and **https://www.soscisurvey.de/reVISeReviewer/** and copies can also be found in our working documents directory.
We coded the ~65 responses we received for each questionnaire, many of which were very thoughtful. We discussed each category of feedback and made a final set of modifications which lead to the set of keywords described here.

Proposed Keyword Set

75 keywords(*) in total spread across the following categories
https://docs.google.com/spreadsheets/d/1DNRY2k1C_gl8nH1g5GR-9MdNQgAgFVC6P6WIzqybjuM/edit?usp=sharing

Categories

- Data Types and Their Use in Vis/VA
- Intended Contributions to Vis/VA
  - General Contributions
  - Evaluation
- Application Areas for Vis/VA
- Visualization/VA Related Topics & Techniques
  - Human Factors
  - Stats & Math, Machine Learning, Data Management Methods & Algorithms
  - Spatial Field Methods & Algorithms
  - General Visualization Methods

*52 fewer than in the current set

Category: Data Types and Their Use in Vis/VA

Geospatial Data	...data with geospatial (lat/lon) locations or trajectories
Graph/Network and Tree Data	...data with network (node/link) or tree/hierarchy structure
High-dimensional Data	...data with a large number of dimension columns (features/attributes) that requires extra effort to process
Data Models	...the structure of statistical and simulation models, model results and outputs, and the parameter spaces of model inputs as for example in machine learning
Scalar Field Data	...spatial/volume data with one or more scalar variables
Image and Video Data	...imagery data in the form of stills or video
Tabular Data	...tables of row/column data with a moderate number of columns that are directly represented
Temporal Data	...data that has a temporal component (e.g. time series, time-oriented data, events, time-varying data, trajectories over time...)
Text/Document Data	...data in the form of text or documents
Vector and Tensor Field Data	...spatial data containing vector and tensor fields
Other Data	...a data type that does not reasonably fit into any other category
Data Type Agnostic	no special expertise on data types is required for my paper

Category: Intended Contributions to Vis/VA

General Contributions

Algorithms	...the design or implementation of data analysis/visualization algorithms
Data Abstractions & Types	... the process of reducing a particular body of data to a simplified representation and/or improvements or new uses of datasets/-types
Datasets	...contributing new datasets for benchmarking or understanding techniques / the field itself
Deployment	...deployment of tools/techniques "in the wild"
Methodologies	...methodologies for visualization incl. design, evaluation, processes, collaboration, ...
Application Motivated Visualization	...applying, adapting, or creating novel visualization techniques to address specific challenges presented by real-world applications; incl. design studies
Guidelines	...deriving or applying guidelines for design and use of visualization & visual analytics techniques
Interaction Design	...the design of interaction techniques and/or interaction design methodologies and practices for any interaction modalities (touch, pen, mouse, speech, proxemics, ...)
Process/Workflow Design	...designing, developing, evaluating, or improving data analysis workflows
Software Architecture, Toolkit/Library, Language	...designing/implementing novel platforms/libraries/toolkits for developing or testing
Software Prototype	...writing or analyzing concrete implementations of tools / systems / applications
State-of-the-art Survey	...conducting, structuring, and writing systematic literature reviews
Task Abstractions & Application Domains	...the practice of eliciting domain or task abstractions and challenges from specific application domains
Taxonomy, Models, Frameworks, Theory	...deriving systematic characterizations of a particular space (e.g. design space, taxonomy of techniques), novel abstractions of concepts, discussions of formalisms
Visual Representation Design	..designing data visualization / visual representations and/or practices/processes of visualization design
Other Contribution	...a contribution type that does not reasonably fit in any other category

Category: Intended Contributions to Vis/VA (cont'd)

Evaluation	
Computational Benchmark Studies	...design/conducting/analysis of computational benchmark studies that for example compare performance results from running implemented techniques/algorithms
Human-Subjects Qualitative Studies	...design/conducting/analysis of qualitative empirical studies involving human participants
Human-Subjects Quantitative Studies	...design/conducting/analysis of quantitative empirical studies involving human participants

Category: Application Areas for Vis/VA

Computing: Software, Networks, Security, Performance Engr., Distr. Systems, Databases	...applications to the general computing domain incl. software, networks, security, databases, visualization (Vis4Vis) etc.
Life Sciences, Health, Medicine, Biology, Bioinformatics, Genomics	...applications to the life sciences: incl. medicine, biology, bioinformatics, genomics, health informatics, or others
Machine Learning, Statistics, Modelling, and Simulation Applications	...applications to machine learning, statistics, modelling, or simulation applications (note: find ML for VIS under "Techniques below")
Physical & Environmental Sciences, Engineering, Mathematics	...applications to physical & environmental sciences, engineering, or mathematics
Social Science, Education, Humanities, Journalism, Intelligence Analysis, Knowledge Work	...applications to the social sciences, education, and humanities incl. knowledge work such as intelligence analysis
Other Application Areas	...applications to an application area that does not reasonably fit in any other category
Domain Agnostic	no special expertise on application areas is required for my paper

Category: Vis/VA Related Topics & Techniques

Human Factors

Collaboration	...collaborative data analysis, collaborative workflows, and theories of collaboration
Color	...the use of color in visualization
Communication/Presentation, Storytelling	...using visualization to communicate or present a narrative or story from data
Data Analysis, Reasoning, Problem Solving, and Decision Making	...support of analytical reasoning, problem solving, decision-making, analysis workflows, and other related cognitive processes
General Public	...the design and dissemination of tools for/to the general public / communication to the general public or mass audiences
Mixed Initiative Human-Machine Analysis	...balancing computational and human effort for data analysis
Perception & Cognition	...perception and cognition
Personal Visualization, Personal Visual Analytics	...design of interactive visual representations for use in a personal context; analytical reasoning by visual representations for use in a personal context

Category: Vis/VA Related Topics & Techniques (cont'd)

Stats & Math, Machine Learning, Data Management Methods & Algorithms	
Data Clustering and Aggregation	...algorithmic and visualization approaches for aggregating or clustering data
Data Management, Processing, Wrangling	...steps for cleaning, processing, and managing data
Dimensionality Reduction	...the use of / techniques for reducing the number of variables under consideration
Feature Detection, Extraction, Tracking & Transformation	... methods for finding, detecting, mining, extracting, retrieving, transforming, discovering and tracking data, features, patterns, knowledge
Large-Scale Data Techniques	...techniques specific to handling large amounts of data
Machine Learning Techniques	...the use of machine learning in visualization / visual analytics
Mathematical Foundations & Numerical Methods	...mathematical foundations and numerical methods and their use
Spatial Field Methods & Algorithms	
Computational Topology-based Techniques	...computational topology and/or topological abstractions and their use
Isosurface Techniques	...extraction and use of isosurfaces and generalizations
Vector, Tensor & Flow Visualization	...techniques for vector fields, tensor flow, tractography, and fluid mechanics
Volume Rendering	...rendering techniques and algorithms for direct visualization of volumetric data

Category: Vis/VA Related Topics & Techniques (cont'd)

General Visualization Methods	
Animation and Motion-related Techniques	...methods using animation or other forms for the display of motion
Art & Graphic Design	...data art, art practice, art-science collaboration, graphic design practice, ...
Cartography, Maps	... design and use of maps and mapping technology
Charts, Diagrams, and Plots	...statistical graphics such as charts, diagrams, or plots (line/bar charts, etc.)
Comparison and Similarity	...methods for visual comparison or determining similarity
Computer Graphics Techniques	...techniques from the field of computer graphics, including raycasting, illustrative / non-photorealistic rendering, etc.
Coordinated and Multiple Views	...linked views, multiple views, coordinated views, coordinated multiple views, or coupled views
Image and Signal Processing	...image and signal processing methods
Mobile, AR/VR/Immersive, Specialized Input/Display Hardware	...specialized interaction and display techniques and hardware (mobile, caves, heads-up displays, physicalization, tangibles,... and combinations of devices)
Multi-Resolution and Level of Detail Techniques	...visualization techniques for showing multiple levels of detail and resolution, including focus+context
Specific Computing and Rendering Hardware	...how to use specific computing or rendering hardware for visualization (CPU/GPU clusters, etc)
Uncertainty Visualization	...visually communicating uncertainty (of data, models, algorithmic results, or the visualization process)
	...a visualization/visual analytics related topic/technique that does not reasonably fit in any category above

The Full Keyword Dataset is available here

https://docs.google.com/spreadsheets/d/1DNRY2k1C_gl8nH1g5GR-9MdNQgAgFVC6P6WIzqybjuM/edit?usp=sharing

Next Steps: Further Improve Reviewer–Paper Matches

The following alternatives could – in addition to keywords – be implemented to improve matching.

- Devising a better visual bidding interface (sorting, filtering,…)
- Finding better bidding categories (instead of want, willing, reluctant)
- Finding good automatic matching help (you liked this paper before, how about this one…)

The Area Chairs Committee could be charged with discussing future improvements to bidding / reviewer matching.

Transition Plans

Overall Considerations

- This is a plan for setting up the **new governance model for VIS 2020** in SLC**.**
- The new governance will be followed by an implementation of the area model for **VIS 2021.**
- The proposed changes are significant and disruptive.

High-Level Principles

- **Seed new committees with members of current equivalent committees**
  V-I-S Steering Committees -> Visualization Council
  VEC -> VEC 2

- **Seed members will have different term length, to enable a gradual transition in the future**
  Use current service time on equivalent committees, resolving ties through random process.

- **Not everything will be worked out smoothly**
  Keep reVISe committee going to work out details until VIS 2020.

- **Many future committees have complicated term limits and nomination/election procedures.**
  Following these procedures is impossible in the bootstrapping phase.
  Seeding from the current V-I-S model ensures fair representation, which propagates over time.

- **reVISe committee will assist responsible committees in handling logistics related to the transition.**

- **External approvals required**
  VGTC ExCom must approve new charters for governance bodies, TVCG EIC & ExCom must sign new MOU

VIS Council

Consists of 7 members, 1 appointed by VGTC

VGTC Chair appoints 1 council member

Current V-I-S steering committees nominate 2 individuals each to serve on council.

- 1 member from each SC will be assigned a long-serving slot (3 or 4 years, randomly selected)
- 1 member from each SC will be assigned a short-serving slot (1 or 2 years, randomly selected)
- SC can choose to nominate into long/short slots or have that part randomized as well

The Council elects its chair from amongst their ranks in the constituting meeting. The chair's term will be that member's term and can be extended once by two years.

Elections would begin in September 2021, with typically one slot per year (4 elected members, with 4 year terms).

VEC 2

Consists of 12 members, 1 appointed by VGTC Chair, 1 appointed by VIS Council, 4 elected

VEC currently has 12 members.

The VEC chair will be grandfathered in.

The VGTC chair is currently part of VEC. The VGTC chair can either sit themselves on VEC or appoint someone as their representative.

The 10 remaining VEC slots can be filled by the other VEC members, unless term limits require rotation out in which case a new member could be appointed.

The current VEC will assign each VEC member to an “elected” or “appointed” slot considering current term limits and staging goals.

Depending on the schedule of rotations, the first elections could be held as soon as Sep 2020.

Transitioning to Areas 1/2

The most time-critical path in transitioning will be implementing the area model

This transition includes things like

- Unifying program committee and histories
- Unifying web presence, including descriptions of areas, examples, etc
  All must be done as part of CFP, so deadline is mid December or early January at latest.
- Negotiating new MOUs with TVCG
- Establishing infrastructure such as PCS and records of PC members

All of these steps must be done carefully

- We plan to keep V-I-S as independent “areas” for VIS 2020
- Full transition to area model to happen for VIS 2021

Transitioning to Areas 2/2

For VIS 2020, V-I-S will remain independent conferences.

To prep for the areas, we propose to implement these changes:

- Appoint 2021 Overall Paper Chairs early to work out the details of the transition, soon after MOU with TVCG is in place (May 2020?).
- Immediately start using the new keywords.
- Ask users to specify one of the areas as a high-quality test run (information not used in decision making).
- Further unify processes of V-I-S to converge on a standard for 2021.
- Work out a new timeline that takes area model into account.

Papers Chairs Committee

Paper Chairs Committee consists of 2 OPCs and 12 APCs.

Before **VIS 2020:**

VEC appoints 2 OPCs (Council doesn't exist yet).

OPC candidates should have been paper chairs before, but should not be 2020 paper chairs.

One of the OPCs will serve for two years (one transition year, one "real year").

Second OPC serves for three years (one transition, two "real years").

By VIS 2020 for **VIS 2021:**

Council appoints 12 area chairs, for each area one with a 1 year term and one with a 2 year term.

drawing from the current paper chairs that are not about to rotate out and the general eligible population.

Term served are adopted as much as possible, or randomly assigned if needed.

Area Curation Committee

Consists of 9 members, 3 year term, ⅓ replaced every year

The Area Curation Committee will be appointed by the council at VIS 2021, drawing from former reVISE members and V-I-S steering committees, and the wider community when appropriate.

1, 2 or 3 year term will be assigned at random.

Unified Program Committee

Approx. 160-170 members

- Proposed by combination of all APCs and OPCs, ratified by VEC2.
- Taking terms with V-I-S into account.
- Appointed after VIS 2020 in time for 2021 review process.

Keywords

The new keywords can be rolled out immediately, in time for VIS 2020.

Although the area model/reviewing proposal depends on having the new keywords, the reverse is not true: the new keywords do not depend on the new model at all.

They will immediately improve the review process even for the current V-I-S model.

Timeline

VIS 2019	2020 OC appointed VEC+SCs vote for Restructuring
2019-10-25	Negotiations start with VGTC ExCom for new governance charters (starting from drafts) Negotiations with TVCG on new MOUs begin
2019-11-01	reVISe2020 formed New keywords replace old keywords in PCS for 2020
2019-12-15	New charter text finalized & approved by VGTC ExCom
2020-02-15	New MOU finalized & approved by TVCG and VGTC ExCom
2020-04-15	V-I-S SCs select Council Members VIS Council formed V-I-S SCs disbanded VEC2 seeded from VEC
2020-05-01	VEC2 announces electable positions on VEC2 Council appoints Papers Chairs Committee for 2021
2020-09-01- 2020-10-01	Community votes for elected positions
VIS 2020	VIS Council appoints Area Curation Committee reVISe disbanded
2020-12	Paper chairs appoint Unified Program Committee

Appendix: Alternatives Considered

Alternatives Considered: Names of Final Areas

Red text indicates the voted decisions.

1. **TER** or **T&E**: Theoretical and Empirical Research
   EVAL: Evaluation, Empirical Research, Perception
   MMEE: Models, Methodologies, Evaluation, Empirical Studies
   SFTM: Systems, Frameworks, Taxonomies, Methodologies, and Models
   TEMMP: Taxonomies, Evaluation, Perception, Models & Methodologies

2. **AFR** or **APP**: Application-focused Research
   ADDD: Applications and Domain-specific Deployment and Dissemination
   DDDD: Design studies and Domain-specific Deployment and Dissemination
   DSAPP: Design Studies and Application-Focused Research

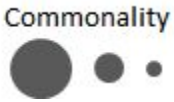
3. **SIV** or **SYS**: Systems in Visualization
   DDDM: Display Algorithms, Devices, Modalities, Audiences
   DDSS: Data, Devices, Systems, Synthesis
   SARM: Systems, Architecture, Rendering, Modalities

4. **VID** (or **V&I**): Visual and Interaction Designs
   VEID (or **V&I**): Visual Encoding and Interaction Design
   VRIT (or **V&I**): Visual Representations and Interaction Techniques
   REP-INT: representation and interaction

5. **DTT**: Data Transformation Techniques
   DTV: Data Transformation for Visualization
   DIP: Data and Information Processing
   DAT: Data-centric Algorithms and Techniques
   DTIE: Data Transformation and Information Extraction.
   DITA: Data, Information, Transformation, Algorithms.
   ATAT: Abstraction, Transformation, Algorithms, Techniques
   DATX (or **DATAX**): Data Transformation, Refinement, Extraction, Augmentation & Management; or Data-related Techniques

6. **IAW**: Integrated Analytics Workflows
   VDA: Visual Data Analysis
   IIMM: Integration, Intelligence, Mining, Machine-learning
   DSML (or **WDM**, **WDML**): Integrated Workflows, Decision Support and Machine Learning

Alternatives Considered: Areas (I)



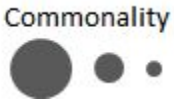
Proposal A

Theory To The Rescue
Squishy People Stuff
Solving Real Problems
Yay Engineering
Visual Data Analysis with Vim & Vigor
Techniques Galore

Proposal B

Foundation & Theory
Life Sciences & Physical Sciences
Humanities and Arts
Other Apps: Finance, Security, ... ?
Representation & Interaction
Presentation and Evaluation
Devices and Collaboration
Big and Large Data
Ubiquitous Visualization
Novel Methodologies
Integrative Approaches

Alternatives Considered: Areas (II)



Proposal C

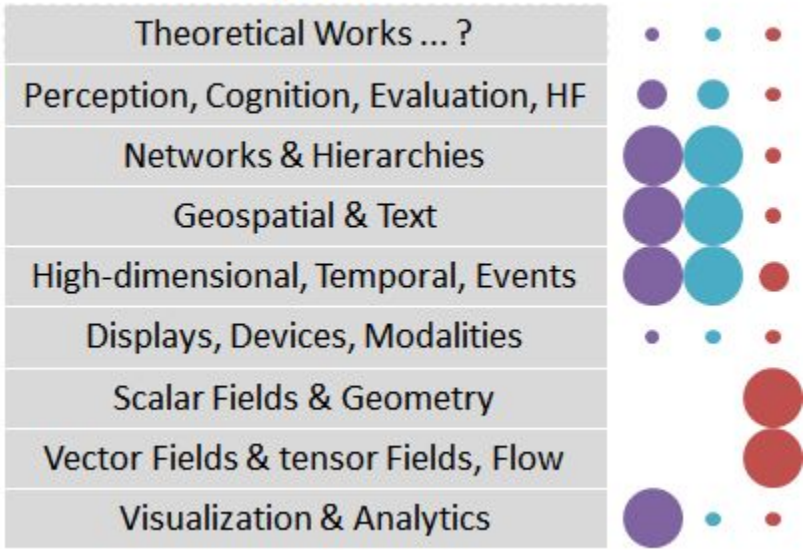
General	Theoretical Foundation
	Empirical Research
	Applications
Visual Semiotics	Visual Representations
	Interaction & Collaboration
	Visual Communication
Visual Informatics	System Platforms & Data Man.
	Information Extraction
	Display Techniques
Visual Analytics	Integration & Optimization
	Decision Support
	Model & Software Development

Proposal D

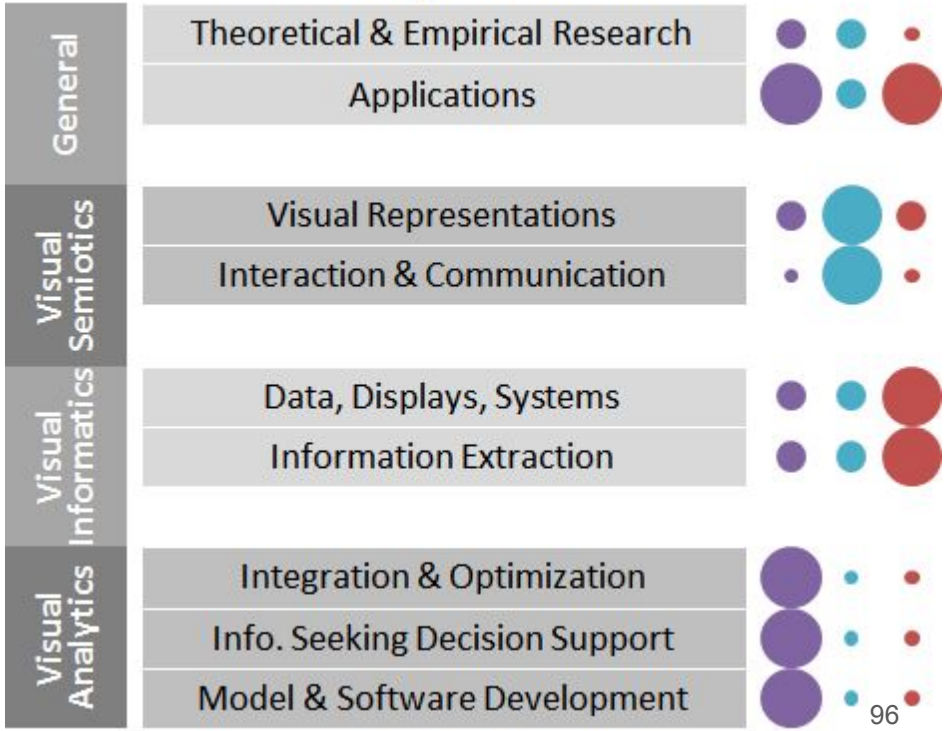
Visualization and People
Specific Application Areas
Understanding & Developing VIS
Perception & cognition
Data Rep. Algorithms & Techniques

Alternatives Considered: Areas (III)

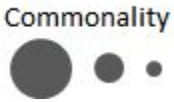
Proposal E



Proposal F



Alternatives Considered: Areas (IV)



Proposal G

Perception, Cognition, Evaluation, HF
Visualization and Interaction Design
Visualization of 3D Spatial Data
Visualization and Data Methods
Displays, Devices, Modalities
Applications, Design Studies, Systems

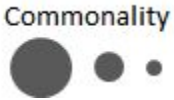
Proposal H

Perception, Cognition, Evaluation, HF
Visualization and Interaction Design
Visualization and Data Methods
Displays, Devices, Modalities
Applications, Design Studies, Systems

Proposal I

Evaluation, Empirical Res., Perception
Network & Tree Data
Volumes & Scalar Data
High-Dimensional Data
Visual Encoding & Interaction T. Design
Displays, Devices, Modalities, Audience
Data Management for Visualization
Information Extraction
Info. Seeking, Decision Support, VDA
Workflow Integration, KD&M
Design Studies and Applications

Alternatives Considered: Areas (V)



Proposal J
Evaluation, Empirical Res., Perception
Design Studies and Applications
Displays, Devices, Modalities, Audience
Visual Rep. & Interaction Techniques
Data Transformations, R. E. A. & M.
VDA: Decision Support, Workflow, ...
Systems, Frameworks, Taxonomies ...

Proposal K
Theoretical & Empirical Research
Design Studies and Applications
Displays, Devices, Systems
Visual Rep. & Interaction Techniques
Data Transformations, R. E. A. & M.
VDA 1: ML/AL plus ...
VDA 2: Decision Support, Workflow, ...

Alternatives Considered: Dual-Area Review Process

Alternative considered: **handling two areas explicitly during review process**

- In the case of TWO areas, the APCs of the 1st area will assign a primary reviewer, and those of the 2nd area will assign a secondary reviewer. The primary and secondary reviewers will assign tertiary reviewers and conduct post-review discussion as usual. The final recommendation will made by the APCs of the 1st area. Should there be some strong disagreement between the two areas (e.g., the 2nd area is absolutely happy to accept the paper while the 1st area may be against such an idea strongly but will not accept the paper into the 1st area), the OPCs will make the final decision.
- Advantage: co-chairs with expertise can weigh in on reviewer assignments.
- Disadvantage: complexity, including the need for inter-APC communication and the lack of support within PCS for handling this information flow.
- The majority vote was to keep the paper in the purview of only one set of APCs during reviewing.

Alternatives Considered: Conflict of Interest

Alternative considered: **CoI model where APCs can submit to their own area**

- Would use existing PCS mechanisms for blinding them to reviewer names, using same mechanism that allows OPCs to submit.

- Rationale for choosing CoI model that disallows submission to own areas by APCs:
  - Thanks to the unified PC, finding reviewers with appropriate expertise is not problematic. Common case is that most papers could fit into more than one area (even if not equally well), so requirement that APCs' own papers must be handled by APCs from another area won't be a problem intellectually. (Evidence: over 50% of papers we coded to test area proposals had secondary as well as primary area code).
  - Also, despite PCS support, it is too easy to accidentally violate anonymity, so we consider it best to minimize the number of papers in need of it.

Alternatives Considered: 3 vs 4 Reviewers

Alternative considered: **switching from 4 reviewers per paper to 3 reviewers.**

There are several models and concerns to consider if the community wants to move from 4 to 3 reviews per VIS paper:

1) Which reviews to keep:
   a) 1 PC member + 2 externals - likely not a good idea as too much power by 1 PC member
   b) 2 PC members + 1 external - primary writes review + summary, secondary assigns external + writes a review. Reduces load on external reviewer pool but gives less training to externals to become future PC members.
   c) 2 PC member + 2 externals - both primary and secondary assign 1 external but only secondary writes a review. Primary serves an editor-like function (leads discussion & writes summary). (=last year's CHI model). Only helps to reduce the load of the PC members, which is currently still bearable (according to results received from a PC questionnaire issued at InfoVis)
   d) 2 PC members + 2 external - primary assigns 2 externals, secondary is blinded to author names and writes a review. Primary serves an editor-like function (leads discussion & writes summary). (=current CHI model). Reduces load on the PC (which is not yet too high) and allows for 3 blinded reviewers (in case of blind submission).

2) How to train / assign PhD students
   a) 75 of 830 reviews were completed by PhD students for InfoVis 2019 (9%), all external. Should we go down to only 1 external review we should consider how to more formally train PhD students in the reviewing process in order to keep a stable and high-quality reviewer pool.

3) Benefits of 4 reviews: safety net if missing or low-quality review, since journal policies require 3 as hard minimum.

Given the large number of options, the reVISe committee did not have the time to come to a firm recommendation on whether a change would be wise and if so which model to choose. Thus the committee recommends to remain with our current model of 4 reviews, leaving it to future Area Curation Committees to decide whether to craft a proposal on this topic after adequate consideration.

Alternatives Considered: Per-Area PCs

Alternative considered: **Replicate current V-I-S PC setup onto areas (per-area program committees and paper chairs)**

- Reviewers will often have expertise in more than one area, just as reviewers have expertise in >1 of V / I / S.
  - Want to avoid burdening reviewers with service on multiple PCs simultaneously.
  - Want to avoid PC members “area hopping” where rotation out of one area immediately followed by rotation into another, so no true break from PC service
- Organizational overhead of coordinating 6-8 committees appears prohibitive. Also, conflicts of interest and reviewer anonymity much harder to handle with 6-8 smaller committees.
- Oversight needed to ensure consistent reviewing and standards, but higher-level committees cannot do this since they should not have content responsibility.
- Overall, a brittle approach considering (likely not infrequent) changes to the area model.
- Per-Area PCs would be more likely to lead to "silos" than a single unified PC.
- Decision: single unified PC is viable, with sufficiently curated set of keywords for reviewers/authors

Alternatives Considered: Rationale for Final Choices

Many variations of divisions of responsibilities between governance bodies were considered; logic behind this proposal:

- VEC2 is primarily responsible for executive matters in the VIS context
  - curating various committees (short papers, posters, tutorials, workshops, etc.) on a yearly basis
  - operational support for OC
  - high time commitment: multiple meetings at VIS, frequent telecons (4-6/year)
- Visualization Council is responsible for long-term and overall scientific and policy matters
  - scientific content, e.g. papers chairs and area model evolution
  - medium time commitment: 3-4 telecons per year

Proposed division of responsibilities offers:

- clean separation of executive vs strategic responsibilities,
- different expertise and time commitments for each committee, and
- well-defined synchronization points and procedures between VEC2 and Visualization Council

Committee sizes designed to

- be appropriate for the estimated workload,
- ensure diverse representation across topics and interest groups, and
- enable meaningful term lengths while ensuring sufficient turnover occurs.

Alternatives Considered: Governance

Fusion of V-I-S Steering Committees into a single VIS Steering Committee

- This is essentially the spirit of this proposal; the Visualization Council is concerned with long-term, strategic matters and is for all intents and purposes a steering committee.
- The name “Visualization Council” is chosen over “Steering Committee” to differentiate from the current model and avoid confusion with respect to historical roles and responsibilities of current V-I-S steering committees.

Keep current model: VEC + V-I-S Steering Committees

- Area model (intentionally) does not split cleanly into V / I / S areas; it is unclear how coordination and steering of areas could occur under such governance.
- A prohibitive amount of multi-way coordination would be required to ensure uniform standards and processes across VIS and to appoint OC and PC positions.

Alternatives Considered: Governance

Include members from Associated Events in VEC2 to provide them with a voice in governance:

- AssocEv definition is vague – “anything pre-approved”; strongly varying levels of size, organization, longevity, focus.
- Likely difficult for VEC2 to select one or more representative members from a large and heterogeneous set of AssocEvs.
- AssocEvs have different and often conflicting agendas, making it difficult to have one or two VEC members represent them fairly.
- Or, would require AssocEvs to organize among themselves in the short and long term to nominate candidates; no channels for this exists currently.

Include specific diversity role in VEC2

- We considered a diversity chair in a observer role without a vote, but felt that this specific structure would lead to problematic "second-class citizen" status. Currently the VEC does not have any members with specific portfolios (in contrast to governance bodies such as the VGTC ExCom). Our current hope is that all members of the VEC will understand diversity to be a core concern, rather than relegating it to be only a single person's portfolio.

Alternatives Considered: VEC2 & ACC

VEC2 & ACC:

One alternative governance structure considered was a single more powerful VEC2 body that subsumed all duties of the current VEC and the current V-I-S steering committees, in conjunction with the Area Curation Committee (that is, there would be no Council).

The advantages would include no confusion about the boundary of scope and duties between the VEC and the Council, and no friction or delays introduced by having one body propose in contrast to a different body that ratifies.

However, the disadvantages would include a very high workload, and a concentration of power to a small number of people.

Alternatives Considered: VEC2 & VSC (Intro)

Another alternative governance structure considered was a split into two bodies: a VEC2 and a Visualization Scientific Committee (that is, no Area Curation Committee).

The 3 subsequent slides explain the VSC model in detail, including arguments for its advantages.

The disadvantages would include the complexity of the VSC two-tier structure, the high workload of the VSC in handling all appointments and the data analysis about areas, and a lack of separation between the power to propose a new area and to appoint papers chairs in it.

The final proposal with three governing entities of the Council, the VEC2, and the ACC was a synthesis that captured many of the strengths of each of these ideas.

Alternatives Considered: VEC2 and VSC II

Visualization Executive Committee v2.0 (VEC2)

VEC2 focuses on the operation matters of VIS conferences and one of its key characteristics is *rapid and executive decision-making*. It may have the same configuration as proposed on Slide 43 or with some small minor modifications (e.g., a vice chair for safeguarding operations in case of emergency). Members of VEC2 may have designated “officer” or “adviser” role for overseeing certain operations and maintaining certain knowledge, which is not formalized in the current VEC structure. VEC2 is responsible for the following **long-term** and **short-term** tasks:

- Maintaining the knowledge, coherence and consistency for running VIS conferences, including maintaining a core set of expertise for the OC of each committee (e.g., finance, promotion), and applying such knowledge to the followings:
  - Selecting venues and GCs of VIS conferences;
  - Liaising with IEEE, IEEE CS, VGTC, TVCG, and CG&A;
  - Advising and assisting the GC and OC of each VIS conference in handling various generic matters, such as track organization, session organization, scedulting, submission and review systems, plagiarism, web content, publication venues, etc.

Visualization Scientific Committee (VSC)

VSC focuses on the scientific matters, and one of its key characteristics is *democratic and fair decision-making*. It may have 12-15 members with an adequate area representation, enabling two stages of an appointment process: (a) candidate nomination in a single or multi-area manner, and (b) appointment in a cross-all-areas manner, and ensuring all suitable candidates are considered. VSC is responsible for the following **long-term** and **short-term** tasks:

- Maintaining the knowledge of people in visualization through the appointment processes, and applying such knowledge to:
  - Appointing the overall papers chairs and the area papers chairs for each VIS conference and the chairs of other tracks featuring strong scientific content, and approving the relevant program committees. Once appointed, these chairs are part of the Organization Committee (OC), and answer to the general chair (GC) except that the papers co-chairs also partly governed by TVCG.
- Maintaining the knowledge about the historical and current developments of VIS as a discipline, and applying such knowledge to:
  - Reviewing and revising the Area Model, Keyword Model, and the CfP annually with some assistance (e.g., operational data, co-chairs);
  - Selecting non-CoI VSC members to lead the annual ToT panel(s) for determining ToT awards.

Alternatives Considered: VEC2 and VSC III

Memberships of the Visualization Scientific Committee (VSC)
VSC is configured to reflect the Area Model. The leadership and members should have appropriate knowledge and experience in VIS research (e.g., research breadth, applications, industrial research). As the most sensitive role of VSC is to make democratic and fair appointment of co-chairs, one ideal structural feature should be to enable (a) group discussion at the nomination stage with a good coverage of all suitable candidates, and (b) group discussion at the appointment stage for selecting co-chairs among candidates. It is necessary to avoid any scenarios when an appointment in an area is strongly influenced by a VSC member who is known to have strong association with the area. For a small committee, such association would easily be established. Hence the VSC is designed to have *N* members where $N > 2K$ (where *K* is the number of areas in the area model). One suggested configuration is to have a VSC chair, *K* full members and *K* associated members (each is named to a subcommittee). In addition, VSC may have an ex-officio member representing TVCG to be consulted for appointing papers co-chairs (i.e., guest editors of TVCG special issue).

The chair and members of VSC may be appointed using the same mechanism as the current SCs, though other mechanisms are also possible. As part of the evolution, if the current three SCs wish to play a role in VSC, one may have the 2x3 members for Areas 4, 5, 6 to be ex-officio members designated by the three SCs during an interim period. If in the future, if the community decided to have full members of VSC elected, the associated members will be referred to as co-opted members.

Nomination and Appointment of papers chairs and the chairs of other tracks featuring strong scientific content.

(a) Nomination (June/July): Three subcommittees, e,g., [Area 1, Area 4], [Area 2, Area 6], and [Area 3, Area 5], each with 4-5 members (full and associated). For each co-chair position, typically there will 3-5 nominations.
(b) Appointment (August/September): The full members meet and discuss all the candidates, and make appointments after considering various balancing factors. The TVCG representative is involved in choosing the TVCG guest editors. The VSC chair informs the successful candidates as well as VEC2 and the GC.

Once track co-chairs are appointed, they report to and are supervised by the GC and VEC. VSC does not get involved in operations. It may be useful to have the VSC chair and some three VSC members in the VEC2 as ex-officio members, who can be tasked to advise these appointed co-chairs in an executive capacity in VEC2.

Alternatives Considered: VEC2 and VSC IV

ToT Awards. In April, 1-3 designated VSC members carry out an initial examination about all eligible papers, report to VSC about potential candidates and potential CoI within VSC. The VSC chair appoints three or more non-CoI VSC members to lead the ToT committee. In May, these members then elect a ToT chair and recruit additional ToT members outside the VSC. The ToT committee completes their tasks in July/August.

Area Model, Keyword Model, Review Protocol, CfPs

- In June or July, receive a report from all track co-chairs, including statistics, successes, issues, and suggestions for changes.
- In August and September, the VSC discusses potential revisions
  - Different individuals may be asked to lead the discussions or working groups on different topics.
- In early October, all proposed changes are communicated to various stakeholders if consultation is necessary.
- During VIS, all changes must be approved and confirmed.
- Because CfPs are out, track co-chairs may seek minor changes to the keyword models, review protocols, and CfPs subject to the executive approval of the VEC chair and VSC chair (who is also a VEC member).

For such a large conference, in general, it will be inappropriate for track chairs to lead the revision of CfPs, Area Models, Keyword Models, and Review Protocol. Meanwhile, track chairs can influence the revision at various stages. Occasionally, there may be a new track being established. For this, the VSC may ask the Track Chairs to take a lead in defining the CfP and the Review Protocol.

Some may have concerns that area representations should not be involved in revising the Area Model. One believes that this will be OK as the area representatives have less than 1/6 votes in the committee, and the VSC can always have a protocol for not allowing them to take part in voting CoI matters. The decisions about removing areas will depends heavily on statistics of submissions. Decisions on merging, splitting, and addition of areas should really hear the views of all areas that may be affected.

Note: The main rationales for having VEC2 and VSC as two separate committees are: (i) their responsibilities require different types of knowledge about the topics, events, and peoples in the field of visualization, different types of management skills, and different levels/patterns of time commitment; (ii) having both provides a better balance of work load; (iii) having a VSC with 12-15 members enables more than one person in each area to contribute to the sensitive appointment decisions; and (iv) there is a less-disruptive pathway to evolve, stepwise, from the current three SCs to a single VSC, then if desired to a fully-elected or partly elected VSC (or Visualization Council). More detailed documentation for this model is available if requested.