IEEE & Engineering for the Americas (EftA)
raising the quality of life
Abstract

The IEEE-USA and the IEEE Education Society seeks to become active participants in the Organization of American States (OAS) Working Group 2 of the Engineering for the Americas (EftA) program.

IEEE involvement in EftA can provide value-added propositions to this task given IEEE’s significant human, technical, and financial resources.

In collaboration with the OAS and the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI), this initiative seeks to greatly facilitate the coordinated development of the sustainable components that are critical to effective and sustainable capacity building, such as: accreditation activities, implementation of technology capacity development, professional development programs, mentorships, entrepreneurial activities, consultants’ networks, community outreach, university student and faculty development, and formal and informal K-12 STEM systems.

There is continuing encouragement from governments, academia, and industry in Latin America & the Caribbean (LAC) region for the concepts of EftA!
Introduction

As stated in the Organization of American States’ (OAS) documents, the Engineering for the Americas (EftA) initiative “overarching goal of is to build engineering capacity, based on quality education that creates workforce capabilities for the solution of local needs and that opens the way for [developing and developed countries] to compete in today’s global economy more effectively.” IEEE seeks to collaborate with the OAS and the Latin American and Caribbean Consortium of Engineering Institutions (LACCEI) to operationalize the concepts of the OAS’s EftA initiative by employing the human, technical, and financial resources of the IEEE. The collaboration will gather together its experts who can lead this initiative forward to implement a functional structure with meaningful processes that can effectively facilitate capacity building and sustainable capacity development.

In collaboration with the OAS and LACCEI, this initiative will contribute to creating holistic and entrepreneurial skills in engineering, enabling mobility, and fostering partnerships between industry, government, academia, and professional associations to achieve educational, economic, and social impacts.

In collaboration with the OAS and LACCEI, this initiative will create a model for a local operating unit of the future, which will possess the capability of: being adapted to local environments/cultures/demands, providing, and sustaining needed processes, structures, products, services – provide tools to enable countries to effectively compete in today’s global economy and raise the quality of life!

Putting a Stake in the Ground: A Place to Launch From

Today successful local OUs [operating units] are not known for meetings where learned papers are read, but for other activities - networking of professionals, career advice to young professionals, pre-university outreach. – 2011 IEEE President Moshe Kam

This version of the EftA initiative contains a comprehensive plan for action. Implementing those plans will flow from this document and from related documents. These documents and this Plan For Action sets a stake-in-the-ground for those who will form the center of gravity.

The overarching concepts and objects of EftA will serve as guidelines from which to create a Local Operating Unit of the Future – an operating unit that can develop and deploying sustainable processes which can, in turn, develop, deploy, and maintain specific products and services that are needed in various geographical areas. And these processes will serve as models for the establishment of a sustainable and meaningful local operating unit (OU) – the local OUs adapt the various components of the models to determine what products and services they will need to support local IEEE members and the wider local community.

Many of these products and services will be similar from place-to-place. However, there will also be a need to vary components of the local model from one locality to another. The basic OU could provide technical meetings, distinguished lecturers, and mentors to local engineers, scientists, and universities to enhance local expertise. But the specific needs will vary from place-to-place. For example, one OU could be best served by providing knowledge and wisdom in solar energy development and maintenance, while another locality may be best served by providing support and guidance as local universities seek to evolve to become fully accredited.

It is critically important to tailor a Plan For Action in various locations, and be aware of: a.) the local culture, b.) the nature of government (the political realities on-the-ground), and c.) other items listed in the “The Challenges” section below.
A Plan For Action: Deep diving

There are many components that can be leveraged to create a meaningful and effective EftA program; the original 2004 EftA plan provides an excellent starting point as we move forward. But as we move forward we must realize that in collaboration with the OAS, this initiative is not simply a matter of, for example, creating an accreditation program, or a nation-wide professional development mechanism, or creating a number of chapters within various IEEE Societies; it is a matter of creating, deploying and managing effective and sustained capacity building and capacity development programs that include: accreditation, professional development, mentorships, entrepreneurial activities, consultants’ networks, university programs, and, other meaningful products and services that are effective and sustainable.

Key Doctrines of EftA (adopted from the OAS’s EftA initiative)

1. **Educational Innovation**: To encourage the innovation and reform of engineering education and the implementation of new educational techniques that involve the productive sector as a key partner, motivator and collaborator in shaping educational improvements and activities that are relevant to market needs as well as foster a culture of lifelong learning [OAS’s Purpose, Key Strategies, Goals for EftA].

2. **Accreditation and Quality Assurance**: To foster activities leading to an understanding to the importance, establishment or enhancement of quality assurance, methods of accreditation, and integration of national, regional, and hemispheric systems [OAS’s Purpose, Key Strategies, Goals for EftA].

3. **Job Creation**: To engage with Industry to create an ongoing real-world experience for students, stimulate employment through internships and coops, and drive a sustained Industry-Academia interaction around producing appropriate outcomes [OAS’s Purpose, Key Strategies, Goals for EftA].

Capacity development must also be a component of the key strategy! But exactly what ‘capacity development’ is a confusing issue! Confusion exists around the term seems to have grown along with its popularity. For some, capacity development can be any effort to teach someone to do something, or to do it better. For others, it may be about creating new institutions or strengthening old ones. Some see capacity development as a focus on education and training, while others take a broad view of it as improving individual rights, access, or freedoms.

For the Institute of Quality and Accreditation for Computing, Engineering, and Technology Programs (ICACIT) in Peru, capacity development:

> “means building professional capacity, which generates better professionals, then professionals can identify and solve local problems, as a result they will not need to migrate, if professionals don’t migrate, their countries will not lose their main resource, this means that countries will not lose competitiveness.” [Enrique E. Alvarez, EftA Goal Chain, 2005].

**EftA Goals:**

- Promote improvement in the quality of engineering education to internationally recognized standards.
- Increase capacity in developing countries by increasing the number of qualified engineers in the region.
• Foster partnerships involving universities, government, industry, professional associations, and the engineering community for participation in national innovation processes.
• Encourage the development of extension services and the enhancement of engineering accreditation and quality assurance mechanisms.
• Contribute towards the harmonization of engineering degrees for increased mobility, development of shared curricula, and inter-institutional collaboration,
• Facilitate the creation of more jobs to expand opportunity, raise overall living standards, and impact the alleviation of poverty.
• Collaborate to obtain and sustain government commitment to improve engineering and technology education.
• Balance the size of various committees and working groups such that there is an appropriate number of people actively involved to be able to work effectively on the task.

Our Challenges

• Functioning under the concept of ‘democracy’: The concepts of ‘democracy’ underpins the structure and function of IEEE and its operating units. For the concepts of EftA to be functional the local environment must be such that the people understand how ‘democracy’ functions and it is also critical that their government operates under the concepts inherent in ‘democracy.’ The challenge will be, and has been, to attempt to operate in countries where the government is not a functionally ‘democracy’ and where the citizens do not understand how ‘democracy’ functions.
  o Team work vs. group work is also a confounding issue. EftA operates under the proposition that those who participate in this initiative appreciate that ‘team work’ is a critical concept for EftA to be successful. There are many IEEE members who reside in countries where ‘team work’ is not a familiar or accepted concept.
  o What is volunteerism: ‘Volunteerism’ in many countries is not present in their ‘culture’ and in some countries ‘volunteerism’ is an activity that is frowned-upon by the government.
• Understanding the difference between capacity ‘development’ and capacity ‘building’: Capacity ‘development’ is a process whereby people, organizations and society unleash, strengthen, create, adapt, and maintain capacity over time. Capacity development is different from capacity ‘building.’ Capacity building is an internal process that is driven by players outside that country. Capacity development is primarily the responsibility of partner countries with donors playing a supportive role. Note: at a practical level, the differences between the labels ‘building’ and ‘development’ may not play a factor during the early stages of this initiative.
• Understanding capacity building and capacity development challenges in developing countries: There are as many differences as there are similarities in what ‘capacity can be built’ from country to country! Enlisting/providing expert advisors/mentors on sustainable capacity requirements to match various country’s specific needs will be a non-trivial task. Collaborating with UNESCO and their Engineering Initiatives Program, UPADI, WFEO, and identifying specific government departments whose mission is capacity building will also be a non-trivial task. The goal is to provide expert advice on sustainable capacity requirements to match country specific needs; what will improve the quality of life!
• Understanding how EftA countries will move forward as they become more self-sufficient: The goals of EftA are excellent for bringing developing countries to a ‘certain point’. But EftA desires to look
beyond that ‘certain point’ and set the stage for sustained capacity development. EftA looks beyond assisting developing countries, it looks toward further evolving those countries as they ‘develop’!

- **One-size does not fit all:** While there will many similarities in what constitutes sustained capacity building, there will also be significant differences in the Plans For Action in the various countries. This will create a situation where applying the results from the Pilot Sites as a one-size-fits-all template for all countries will not be a reasonable expectation—each country will require an individualization in their Plan For Action.

- **Existing national engineering organizations:** There appears to be national engineering organizations in LAC countries and in African countries. During the accreditation development processes, assessing the functionality of those national organizations, and in-dealing with those national engineering organizations is critical.

- **On-hand professional advice and follow-up activities:** The regional nature of the project provides a sufficient critical mass of countries to warrant the development of a pool of specialist technical expertise and service providers who can provide follow-on services. EftA must insure that the pool of specialists can bring their expertise and provide services such that ‘they can fly on their own’!

- **Operationalized capacity building/development:** Providing assistance with establishing nation-wide institutions to address various issues, and goes beyond simple capacity building/development and is problematic. While capacity building/development contributes to the creation of national institutions and activities, these activities alone cannot necessarily ensure a functional institutionalization of a meaningful and effective program(s). EftA is, therefore, focusing on establishing what can be termed an "operational framework" - the creation of an environment in which functioning professional institutions (e.g., IEEE, universities) are able to effectively interact with their government and the private sector to jointly insure capacity development/building This will also necessarily require the active engagement of the financial community.

- **Substantial involvement of the private sector:** A key focus is to augment foundational knowledge building and the design of national governance structures with more industry oriented activities that aim to address industry-specific institutional, legal, financial, and capacity barriers. The project should contain an integral learning-by-doing approach to enhance the capacity development and management skills of local private sector stakeholders.

- **Assessing the long-term impact:** Assessing the long-term impact of management training initiatives is more challenging due to the long-term nature of development and interactions among the various facets of EftA and events in the country and world.

- **When EftA goes away:** Given the reliance on external donors for funding in EftA’s Plan For Action, there will be strategic and financial resource implications for policy makers in transitional and developing economies in-order to maintain long-term meaningful capacity development/building.

- **Funding for salary/stipends:** It is highly problematic to expect the amount of work/effort that unpaid leaders can be expected to perform without compensation compared with the amount of work/effort that would flow from compensated workers. However, there are funding sources that allow salaries/stipends to be paid (e.g., USAID, various industry grant programs).
What is the Wrong First Step—And, What is Not the First Focus

While there are many components of capacity building, which will vary from country-to-country, no single component can be of greater focus or importance than any other component. For example, accreditation cannot evolve too far in-advance of other components; otherwise graduates from those accredited programs will not be able to become employed as ‘jobs’ will not have materialized given the lack of need for them!

Equally important is maintaining a wider view of the components that will bring about ‘success’. While, for example, globalization, universal broadband access, and accreditation are critical components of EftA and capacity building, however, an exclusive focus on them will cause a loss of meaningful focus on other equally essential components.

A Gathering of Exceptional Leaders – the Steering Committee

The IEEE Region 9 (Latin America and the Caribbean) Director, Norberto Lerendegui (Argentina) and the Region 9 Board of Governors formally endorsed this initiative at their 2015 Annual Meeting and formed an *ad hoc* EftA Committee. The members of the *Steering Committee* are:

- **Rob Reilly** (USA), 2015-2016 IEEE Board of Directors (Division VI Director),
- **Antonio C Ferreira** (Brasil), 2016-2017 IEEE Board of Directors (Region 9 Director),
- **Maria Mercedes Larrondo Petrie** (USA), Executive Director, LACCEI,
- **Teofilo Ramos** (Mexico), 2016-2017 IEEE Region 9 Director-elect,
- **Enrique Alvarez** (Peru), Director, ICACIT; former IEEE Region 9 Director,

Sponsors

- IEEE Region 9 (Latin America & Caribbean Region)
- IEEE Education Society
- IEEE Colombia Section
- IEEE Peru Section
- ICACIT (Institute of Quality & Accreditation for Computing, Engr, and Technology), Peru
- Dept. of ECE, National Distance Education University of Spain (UNED), Madrid, Spain

Everyone Must Have a Purpose-Function

In Phase I, the Pilot Sites will have similar needs and they will have varying needs. These IEEE operating units, IEEE leaders, and other experts will have a specific role in Phase I.

Each stakeholder (listed below) will have a significant role in Phase 1 and beyond. The various stakeholders (listed below) may have a direct, heavy lifting, role in the various Pilot Sites, some will have an advisory role to provide guidance/wisdom as EftA moves forward. They will become part of EftA as we move forward:

- **Manuel Castro** (Spain), Professor, Spain National Distance Education University,
- **Lorena Garcia** (Colombia), Section Chair, IEEE Colombia Section,
- **Pedro Duran** (Peru), Section Chair, IEEE Peru Section,
- **TBD**, Region 9 Section yet to be determined,

The Steering Committee

To move forward in 2016 and beyond we must examine the activities and potential activities of OAS-EftA since its 2004 inception and apply what we have learned from the IEEE in Ireland Project (see Appendix) and what
we learn from the 2016 and the 2012 IEEE MGA Member Segmentation Survey (see Appendix). Our first activity of the **Steering Committee** will be to:

- Review the [2004 Plan of Action; Lima Declaration; OAS’s Purpose, Key Strategies, Goals for EftA](#).
- Review the Plan of Action employed by the IEEE Peru Section to develop ICACIT, which is: for national accreditation, to develop local operating units of professional organizations to bring together and sustain local efforts for professional development, networking, *etc.*
- Identify first wave goals, second wave goals, key stakeholders (*e.g.*, US Department of State, Organization of American States, USAID, major professional organizations (*e.g.*, ASME, ASCE, NSPE)), and,
- Identify champions. For any phase of EftA to be successful it is imperative that champions to provide wisdom and guidance for various components be active and that the *center of gravity* has a personal relationship with them.

More specifically, the **Steering Committee**, will design a road map regarding *how* to move forward:

- Establish meaningful contact with an official(s) at UNASUR, the Union of South American Nations (Unión de Naciones Suramericanas) and CARICOM (Caribbean Communities), Latin America & Caribbean Consortium of Engineering Institutions (LACCEI), and the Caribbean Accreditation Council for Engineering and Technology (CACET),
- Identify key stakeholders who will establish the center of gravity for EftA,
- Identify/enlist industry and academic partners,
- Establish appropriate local and regional mid-management leadership structures, functions, and processes,
- Support local center-of-gravity to marshal a cadre of boots-on-the-ground,
- Design mechanisms to deliver and support professional development, continuing education, courses, and facilitate collegial gatherings in Spanish, Portuguese, English, and French.

Based upon the IEEE in Ireland Project (see Appendix) and the IEEE MGA 2016 and the IEEE MGA 2012 Member Segmentation Study (see Appendix), develop an **action plan for the Pilot Site Phase** for stakeholders, define leadership roles and advisory roles and determine what each stakeholder is capable-of, what they can contribute, stakeholders should fulfill a *meaningful and definable* role.

- Identify and understand the **capacity building challenges in the Pilot Site** countries,
- Define and implement **activities** that will **support sustained capacity development** in the Pilot Site model (*e.g.*, professional development activities, consultants’ network, mentorship group, student activities, ongoing Senior Member elevation initiatives, entrepreneurial networks, continuing ‘soft skill’ presentations, leadership development initiatives),
- Promote the use-of and innovative research-in Online laboratories and collaborative tools for undergraduate and graduate education and research,
- Establish a national/regional **accreditation structure** in concert with IEEE Educational Activities Board, following the ICACIT and CACET models,
- Enlist a person who is/was an **ABET evaluator** who is knowledgeable in sustaining/maintaining the skills of those who will be accreditation evaluators,
Under the leadership of the IEEE’s National Society Agreement Committee, establish a meaningful relationship with national societies where EftA will initiate Pilot Sites in Phase I (see: http://www.ieee.org/about/corporate/agreements/regional.html),

- Promote language-centric professional journals (e.g., Spanish, Portuguese, French), using IEEE RITA to highlight non-English speaking professionals,
- Develop a model for entrepreneurial as well as consultant activities and create local committees that will be an integral part of the local initiatives,
- Expand the meaningfulness and effectiveness of an IEEE local operating unit to provide products and services (e.g., accreditation structure, certification mechanism, Distinguished Lecture Programs, technical expert forums, industry summits, develop/sustain professional chapters and student branches, consultant’s networks, entrepreneur’s networks),
- Draft grant applications for various sources (e.g., IEEE New Initiatives, USAID), and,
- Identify several Pilot Sites to serve as proof-of-concept to demonstrate the viability of the Plan For Action.
  - Identify the needs of each pilot site,
    - Evaluate the value propositions for the components of the pilot site, each pilot site may have similar components and, will probably have components based upon their divergent situations.

**Being a Pilot Site**

It could be unmanageable to allow more than a few Pilot Sites. However, with highly engaged local management (a local dynamic center of gravity), we might be able to accommodate a relatively large number of participants. This will require direct active involvement on the part of strong committed leaders. This will, at least initially, require some funding support from the Pilot Site Sections. The essential point regarding the number of IEEE Sections that can be involved as Pilot Sites depends upon the center of gravity (local leadership) in each IEEE Section (or geographical area where there is no IEEE Section or Sub Section) that will drive our EftA initiative forward!

The IEEE Peru Section will be involved as they have an excellent operating model that we can benefit from. The IEEE Colombia Section will also be a Pilot Site as they have a very active membership base. We will also be deploying a Pilot Site project in Haiti as that country is most-in-need of our support and will provide us with the most basic development lessons for EftA initiatives.

To be very clear, the number of Pilot Sites will be determined by the level of involvement that an IEEE Section can muster (i.e., primarily human resources in-country, secondarily financial contribution).

**Criteria to be a Pilot Site**

Each Pilot Site must identify (at least) one person to serve as the center of gravity for that Pilot Site activity. This person(s) must be a respected local leader who can lead, cajole, exhort the leaders of local activity. This person should realize that direct involvement in local EftA-related activity(ies) may divert the center of gravity’s attention away from the overall Pilot Site activities, thus he/she must be capable of enlisting and overseeing operations within the Pilot Site without becoming involved in the day-to-day functions. If possible, funding should be made available for this person(s) use. We recognize that for some Pilot Sites funding is not available. If the Pilot Site is served by an IEEE Section or Sub-Section, endorsement by the Section/Sub-Section Chair is needed; if not, then endorsement by the Region Director is needed. It is critical that the local center of gravity develop of meaningful working relationship with his/her countries national engineering organization(s) and national accrediting agency and with the local IEEE members.

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**Assessment of progress will be based upon IEEE Section Vitality Standards and guided toward ABET standards…**
As we move forward we will conduct a needs assessment of potential Pilot Sites. For those Sections/areas that have the potential to support a Pilot Sites, we will:

1. Identify and empanel a committee that will serve as the local center of gravity to drive activity,
2. Review the United Nations Development Plan (see attachments) checklists to determine needs, examine and utilize the 2012 & 2016 MGA Member Segmentation Surveys, and the IEEE in Ireland activities summaries,
3. Survey the IEEE members in Pilot Site Sections to determine their needs,
4. Create a model for an IEEE Local Operating Unit of the Future based upon the needs assessment of the Pilot Site,
5. Collaborate or create a national engineering organization (e.g., ICACIT, CACET), and,
6. Evolve a plan for interaction with relevant federal government officials.

In Phase I, we will follow the Plan For Action developed by the Steering Committee, we will:

a. Evolve the OAS’s Purpose, Key Strategies, and Goals for EftA statement into an EftA Plan For Action by: 1.) reviewing the purpose, key strategies, and goals, 2.) review past EftA activity and accomplishments, 3.) identifying first wave goals, second wave goals, and, 4.) outlining strategies and tactics to accomplish the various goals,

b. Apply the findings from the 2012 and 2016 IEEE-MGA Member Segmentation Survey results to identify prospective activities to include in the Plan For Action,

c. Promote the use-of and innovative research on Online laboratories and collaborative tools for undergraduate and graduate education and research,

d. Based upon the findings of our IEEE in Ireland project (see Appendix), identify meaningful services and programs that will raise the quality of local professionals and raise the quality of life in each area, we will create a plan to initiate similar services and programs in various Pilot Site areas (i.e., in LAC countries, and in African countries),

e. Identify a person to be the center of gravity to contact various corporations, others that could support EftA, and enlist financial support and/or in-kind support from industry and governments,

f. Determine if IEEE HKN student honor society chapters can be formed on various local campuses,

g. Identify key stakeholders (and others (e.g., USAID)) who can meaningfully contribute value; a consortium of capacity building providers to work toward a common goal,

h. Develop a shared understanding of the roles, capabilities and relationships of/among the stakeholders who must become the center of gravity for EftA,

i. Employ meaningful assessment tools (i.e., IEEE Section Vitality Standards, ABET Standards),

j. Evaluate progress based upon IEEE Section Vitality Standards and upon ABET standards, and,

k. Apply for funding to bring key stakeholders together to review past performance, review documents, identify stakeholders who can provide critical and sustained leadership, and then:

   a. Identify a person to be the center of gravity to apply for:
      i. an IEEE New Initiative Proposal grant. These grants typically require US$100,000 or more for a 12-month period. IEEE Seed Funds are also available for projects up to $40,000,
      ii. a USAID grant like the proposal to the IEEE New Initiative Proposal, and,

    j. Identify a person to be the center of gravity to contact other professional organizations/groups and seek their involvement, funding, or, in-kind support.
In Phase II, we will:

k. Organize Pilot Site implementation in several countries. These Pilot Sites will operate with the consent of the local IEEE Section (or Region where no Section exists). Working with EftA leaders, the Pilot Site will secure commitments from local IEEE officials, industry, and government leaders to actively support the implementation of the EftA’s Plan For Action in their country. Each Pilot Site will establish an effective relationship with their national engineering organization (e.g., ICAYT) that will collaborate with local IEEE officials, EftA leaders and other stakeholders; they will:
   1. Liaise with government, industry, and various professional organization,
   2. Sponsor nationwide professional events,
   3. Link IEEE Section/Chapter functions with each national organization,
   4. Create funding source(s) to support paid staff at national office,

l. Review/assess progress of EftA based upon IEEE Section Vitality Standards and upon ABET standards.

In Phase III, we will:
m. Review the activities, adjust as needed and proceed to roll-out the renewed EftA initiative on a wider phased basis.

APPENDIX

- **Engineering for the Americas**, Reginald Vachon, Chair, International Activities Committee, American Association of Engineering Societies (AAES), June 2013
- **Transforming our world: the 2030 Agenda for Sustainable Development**, the 17 goals set forth by the United Nations. This document is important as EftA will be operating in parts of the world that have wide-ranging sustainability issues.
  Note: even though this is a 2009 publication, it presents a wider view of capacity building, which is what EftA is focused toward. This primer addresses the basic elements of the UNDP approach to capacity development. It provides a simple, cogent, and accessible illustration of the UNDP Capacity Development Approach for the benefit of development practitioners both within and beyond the UN development system – a real-world guide to real-world applications to strengthen and contribute to national capacities for development.
- **IEEE in Ireland Project**: This initiative began in 2014. It was driven by a desire for a well-defined structure in Ireland through which to provide activities that are valuable to local IEEE members. This opportunity in Ireland is providing an excellent Pilot Site to identify what the structure and function of an IEEE Local Operating Unit of the Future should be; these local IEEE Operating Units will be a key facilitator of globalization. 
  o IEEE in Ireland Working Group document 1
  o IEEE in Ireland Working Group document 2
- **Caribbean Accreditation Council for Engineering and Technology** (CACET) 
  o CACET’s Strategic Plan
  o CACET Accreditation Manual
- **CACET Training Manual**
- **CACET Charter and Operation Manual**
- **CACET Strategic Plan**

- **Institute of Quality and Accreditation for Computing, Engineering, and Technology Programs (ICACIT) forthcoming**

- **IEEE Position Paper on Accreditation of Academic Programs in Engineering, Computing and Technology** (forthcoming)

- **2016 and 2012 IEEE-MGA Member Segmentation Survey**: which identified the services and activities that local IEEE members desire. Areas of high importance to members but in which they rated their satisfaction lower are professional networking, continuing education, and career resources. Students had a similar list but added that they’d like more awards and scholarship opportunities, the chance to get involved with humanitarian projects, and videos of conference highlights.
  - **PowerPoint presentation about the segmentation study**