### **Sustaining the Future of Plant Breeding**

Plant Breeding Coordinating Committee

http://www.nimss.org/projects/17576

SCC80 PBCC State Representatives Work Session August 14, 2020, 12-130 pm CST Plant Breeding Coordinating Committee Southern Coordinating Committee 80 (SCC80)

### Agenda

Time	Торіс	Presenter	
12:00 – 12:10 pm	Welcome and introductions	M. Kantar	
12:10 – 12:15 pm	PBCC history, present and future	M. Kantar	
12:15 – 12:25 pm	Objective 1	K. Evans	
12:25 – 12:35 pm	Objective 2	P. Byrne	
12:35 – 12:40 pm	Objective 3	M. Kantar	
12:40 – 12:50 pm	Objective 4	T. Lübberstedt	
12:50 – 1:00pm	Objective 5	M. Kantar	
1:00– 1:05 pm	Discuss Renewal and new potential projects	M. Kantar and R. Pratt	
1:05 – 1:30pm	Renewal discussion in breakout groups		

### The Plant Breeding Coordinating Committee is the USDA-

sponsored advisory group of reps from land grant universities

### <u>PBCC</u>

- Mikey Kantar–Chair
- Rich Pratt– Vice Chair
- Wayne Smith Secretary
- Duke Pauili- Incoming 2020 Secretary
- Ksenija Gasic Past Chair
- Kate Evans Past Past Chair
- Thomas Lubberstedt Executive Committee Member
- Marceline Egnin Executive Committee Member
- Patrick Byrne Executive Committee Member

**Representatives** 

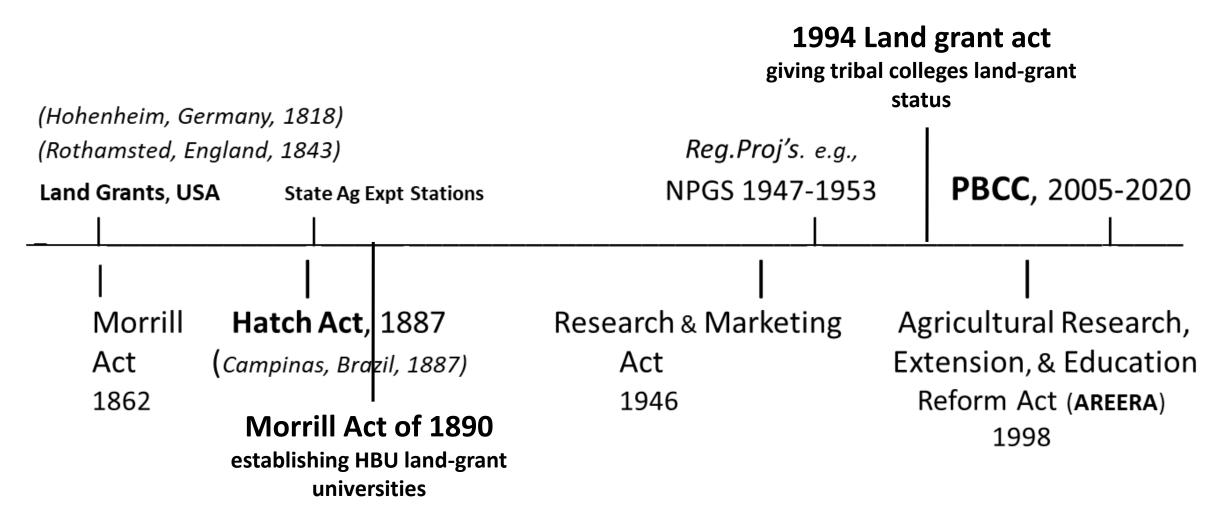
- Robert Gilbert Administrative advisor
- Edward Kaleikau NIFA representative
- Ann Stapleton USDA-ARS representative



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#### Time line of public agricultural research :





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### Coordination Committees (CCs): A particular type of MSP

CCs are similar to MSPs in some aspects:

- CCs are peer-reviewed; must be approved by SAES directors;
- $\circ$  CCs address objectives of high priority among more than one SAES

### CCs differ from MSPs in:

• CC's don't typically receive Hatch funds for work on objectives

• Hatch funds, if any, usually for travel of SAES rep. and/or % of SAES member salary (decision of each SAES director)



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### Origin of a coordination committee on plant breeding

- Studies & observation identified steady decline in national. plant breeding investment
  - National Plant Breeding Study Vols. I-IV; K J Frey, 1994-2000.
  - Exploration of resources invested 1990-94 by public/private sector workshop, Iowa State U., USDA-funded (CSREES, ERS)
  - Guner & Wehner, NCSU, 2003
  - Future of Plant Breeding Education in the Public Sector
    - Symposium, Michigan State, 2005. P Gepts & J Hancock. 2006. Crop Sci. 46:4
  - F. Bliss et al., UC Davis, summarized at NAPB 2015
- Together
  - Found significant *reduction* in *number* of *public* plant breeders
  - Described substantial *weakening* of university plant breeding *education*



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### Plant Breeding Coordinating Committee, PBCC: Approved as SCC80 in 2006

First meeting: North Carolina State, Feb 8–9, 2007 (T. Stalker; Stuber and Hancock 2007) Initial project: 2006–2015; "Plant Breeding "

- Describe long-term national importance of plant breeding infrastructure and education;
- Increase national awareness of plant breeding's contributions to U.S. Economy

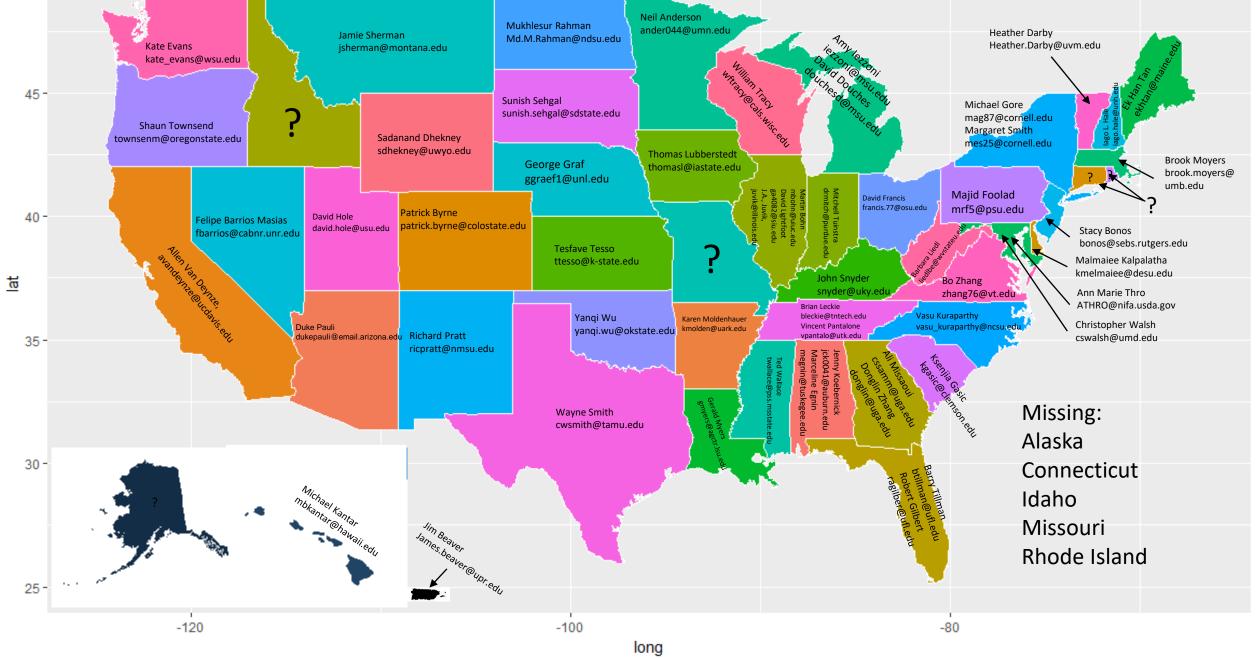
Current project: 2015 – 2020 "Sustaining the Future of Plant Breeding"

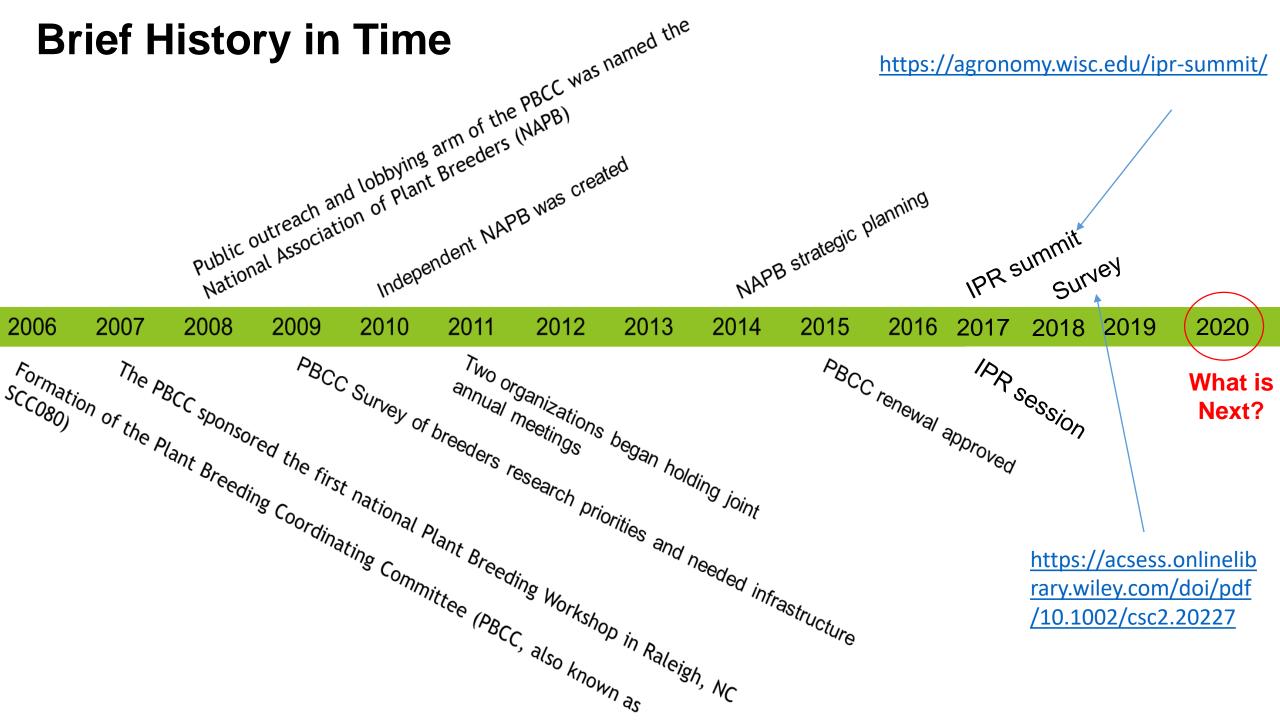
• 1)Information/data; 2) Genetic resources; 3) IPR; 4) Education; 5) Communication

<u>New Approved project: 2020—2025 "Imagining the Future of Plant Breeding"</u>

• 1) Resource Analyses; 2) Genetic resources Conservation and Utilization; 3) Education; 4) Communication

### Plant Breeding Coordinating Committee State Reps





### **Current objectives**

- 1. Collect, analyze, and disseminate information about the U.S. plant breeding effort in both public and private sectors (Kate Evans)
- 2. Promote the conservation, characterization, and utilization of plant genetic resources and access to them (Pat Byrne)
- 3. Identify Best Management Practices for public sector IP protection to encourage the creation/distribution of crops (Bill Tracy) completed
- Optimize opportunities for public-private collaboration in plant breeding research and education, including continuing education for plant breeders (Thomas Lübberstedt)
- 5. Foster communication among public plant breeders and federal agencies on policy issues, including alerts to threats to agricultural security that are relevant to plant breeding (Mikey Kantar)

# 2020 Updates

**Objective 1:** Collect, analyze, and disseminate information about the U.S. plant breeding effort in both public and private sectors

Subcommittee lead: Kate Evans



- Initial focus on <u>public</u> programs
- Survey committee: Kate Evans, Ksenija Gasic, Mikey Kantar, David Francis & Sarah Kostick
- Teamed up with Dorrie Main's NIFA NRSP10 and NSF PGRP projects
  - Long term database support (for future regular surveys)
  - Funding for Michael Coe, Cedar Lake Research Group LLC, for survey design and analysis





#### ORIGINAL RESEARCH ARTICLE 🙃 Open Access

### Plant Breeding Capacity in U.S. Public Institutions

Michael T. Coe, Katherine M. Evans 🔀, Ksenija Gasic, Dorrie Main

First published: 24 May 2020 | https://doi.org/10.1002/csc2.20227

Highlights:

- Significant reduction in personnel over last 5 years
  - aging demographic of program leaders
- Budget shortfalls/uncertainty endanger/constrain support of key personnel, maintain core infrastructure & operations, make use of current technology
- Reduced/sporadic funding → focus on sustaining core operations
  - reduced graduate student/postgrad training

**Objective 2:** Promote the conservation, characterization, and utilization of plant genetic resources and access to those resources for plant breeding.

### Subcommittee lead: Pat Byrne



Sustaining the Future of Plant Breeding: The Critical Role of the USDA-ARS National Plant Germplasm System

P. Byrne, G. Volk, C. Gardner, M. Gore, P. Simon, S. Smith

Crop Science 58:451–468, 2018

### Two infographics on **Plant Genetic Resources were** funded by PBCC/NAPB, targeted to the public.

#### Plant breeders utilize the genetic diversity of plant genetic resources (PGR) - the wide range of crop species and their wild relatives-to develop new crop varieties. PGR include current and traditional Plant breeders use PGR by dem yellow varieties and related wild plants. evaluating plants for traits of interest, selecting the best, rop wild relatives are the and crossing them to adapted incestors of crops and related varieties. Landrees are traditional varieties selected by farmers for a deptation b local conditions. PGR are crucial for adapting crops to changing climates. variaties have been de art breeders and farme combating new strains of diseases and insects, and developing healthier foods ..... 11140 5.8.B...... \* 8.01 scouire, maintai document, and stribute PGR. . ..... unar .... -----Declining land and water availability 110 After thorough PGR evaluation Evaluation and often subsequent breeding with current crop varieties, a new Crossin improved variety with novel traits is developed. 2 3 14 Plant breeders use PGR to develop improved varieties that are: More Nutritious Insect Resistant Higher Yielding Disease Resistant Vheat var jefi es regi star nco rptorate resistance gen For more information, contact: Patrick Byrne@colostate edu or GayleVolk@unda.gov Colorado Berne, Volk et al. 2018. Systain ins the Extern of about breeding: The or Rical role of the USDA

NAB

ARS/National/Plant Germplanen System Crop Science 58:452–458 De sign Gredit: Kucera Design Studio

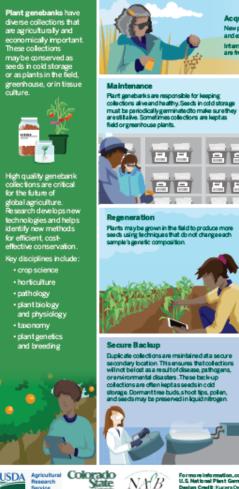
THE KEY TO GLOBAL FOOD SECURITY

PLANT GENETIC RESOURCES

USDA

#### PLANT GENETIC RESOURCES GENEBANKS AND CONSERVATION

Plant genetic resources - the wide range of crop varieties and their wild relatives - are important to safeguard food security, both now and in the future.



ISDA

Barvine



New plant materials come from plant explorations and exchanges within the country and internationally. International imports are tested to make sure they are free of pathogens.

> Evaluation & **Characterization** Trait data are recorded for the plant collections In addition, genetic methods assess collection diversity and determine if varieties are true to type. These data can als obe used to identify collection gaps. Collection documentation is critical for genebankuser communities to identify materials of interest.



Duplicate collections are maintained at a secure secondary location. This ensures that collections will not be lost as a result of disease, pathogens, or environmental disasters. These back-up collections are often kept as seeds in c dd storage. Dormant tree buds, shoot tips, pollen, and seeds may be preserved in liquid nitrogen.

NAB

Plant Germplasm System

Datafor the source, traits, and maintenance

of genebark collection materials are kept

in databases, such as GRINGlobal, GRIN-

Global is a publicly-available website that provides up to date information for

genebank collection of the U.S. National

**Documentation** 



provided to scientists who need access to novel genetic variation for research andbreeding

no re Information, contact: Gayle Vol KBusda, gov or Patri ck Dym efficalo state edu U.S. National Plant Germplasm System: https://www.an-grin.gov/Pages.Collection Design Credit: Kucara Design Studio

### Ebook on crop wild relatives published April, 2020

### Crop Wild Relatives and their Use in Plant Breeding

Gayle Volk and Patrick Byrne





https://colostate.pressbooks.pub/cropwildrelatives/

8 chapters released, 10 in development. Each chapter contains text, embedded videos, and references.

The ebook was inspired by PBCC and made possible in part by funding from USDA-ARS, Colorado State University, IICA-PROCINORTE, and USAID.



Higher Education Challenge Grant Awarded June, 2020

"Enhancing Educational Outcomes For Plant Genetic Resources Conservation and Use"

OBJECTIVES

- Develop an organized series of learning resources (videos, ebook chapters, images, etc.) covering PGR topics;
- Establish an online repository to host, organize, and track usage of the developed content;
- Develop and offer three 1-credit graduate-level courses on PGR conservation and use in plant breeding and genetics;
- Disseminate the developed materials broadly, including through the Plant Breeding eLearning for Africa Program.

The grant stems from discussions at the 2015 PBCC meeting in Pullman, ... which led to a Crop Science review article in 2018, ... and the HEC proposal in 2019.

Participants	<u>Colorado State Univ.</u> :	Pat Byrne (PI) Maria Munoz-Amatriain Jill Zarestky
	Iowa State Univ.:	Walter Suza
	<u>USDA-ARS</u> :	Gayle Volk, Fort Collins, CO Candy Gardner, Ames, IA Gary Kinard, Beltsville, MD
	<u>Consultant</u> :	Deana Namuth-Covert, Lincoln, NE

**Objective 3**: Identify Best Management Practices for public sector IP protection to encourage the creation/distribution of crops

### Subcommittee lead: Bill Tracy

https://agronomy.wisc.edu/ipr-summit/

- Continuing to educate
- Recently tech transfer professionals
- Share Document with Offices of Technology Transfer

- **Objective 4:** Optimize opportunities for public-private collaboration in plant breeding research and education, including continuing education for plant breeders.
- Subcommittee lead: Thomas Lübberstedt
- **Expected Outcomes and Impacts:** Public-private collaboration
- Number and quality of plant breeding graduate students maintained or improved
- White paper or journal publication produced on core competencies for plant breeding students
- Public-private collaborative research proposals funded

### Core Concepts in Plant Breeding: Current Status 2019

- Core outcome/concept/learning objective lists generated for all 8 ISU MS PLBR courses (S18)
  - "Course pairing" to identify gaps and redundancies; comply with Bloom (F18)
- Hierarchical Web-tool for MS PLBR core concept/outcomes/learning objectives (F18)
- Feedback from ISU PLBR faculty (F18)
- Feedback from stakeholders / other universities outside ISU (S19)
- Public availability of Web-tool (F19)

### Core Concepts in Plant Breeding: Current Status 2020

- No feedback from other universities outside ISU (S19) after sending hierarchical web-tool
- Public availability of Web-tool (F19): Dorrie Maine agreed to help developing a web-tool

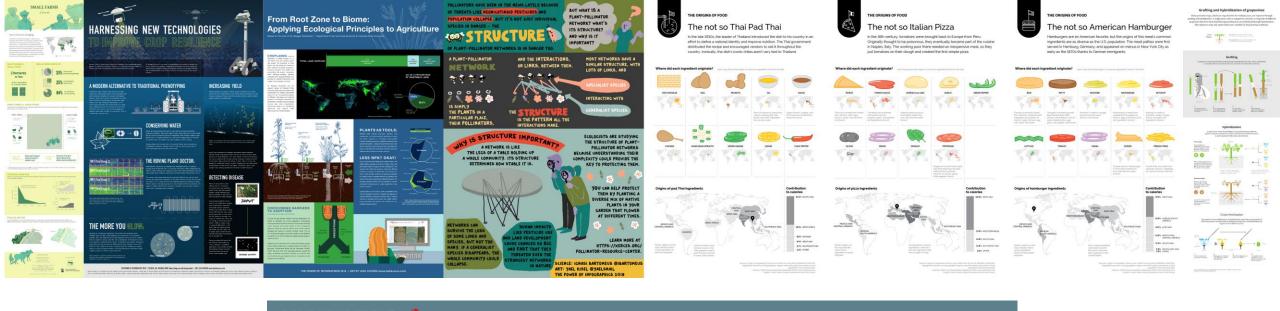
starting in 2020

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- White paper initiated with Assibi Mahama, Mike Retallick, Dorrie Main, Martin Bohn
- Planned submission to USDA HEC in 2021

- **Objective 5**: Foster communication among public plant breeders and federal agencies on policy issues, including alerts to threats to agricultural security that are relevant to plant breeding
- Subcommittee lead: Mike Gore, Mikey Kantar





Comment OPEN ACCESS Published: 06 August 2019

## Science-graphic art partnerships to increase research impact

Colin K. Khoury <sup>™</sup>, Yael Kisel, Michael Kantar, Ellie Barber, Vincent Ricciardi, Carni Klirs, Leah Kucera, Zia Mehrabi, Nathanael Johnson, Simone Klabin, Álvaro Valiño, Kelsey Nowakowski, Ignasi Bartomeus, Navin Ramankutty, Allison Miller, Meagan Schipanski, Michael A. Gore & Ari Novy

Communications Biology 2, Article number: 295 (2019) | Download Citation 🚽

### Best Practices Worksheets Available

<u>https://www.plantbreeding.org/files/napb/science-communication-for-plant-breeding-tips-combined.pdf</u>

#### Science Communication for Plant Breeding Tips

#### How to write a blog on your research?

- 1. Keep things short. A good length for a blog post is 500 to 800 words.
- 2. The primary audience for this blog is the general public. So:
  - Start with the question (the one assigned), and make sure your conclusion addresses the question again
  - Keep your explanations simple
  - Don't worry about being an absolute subject-matter expert. Being relatable is the most important factor in blogging
  - Avoid technical terms and jargon
  - Use a conversational, informal tone
  - · Write with examples for your points whenever you can
  - Use concrete, specific language in your post
  - The goal is for the post to read at the 8<sup>th</sup> grade level
- 3. Identify photos to go along with your post, whenever possible, these are more memorable than the text
- 4. A good way to check the reading level is the hemingway application http://www.hemingwayapp.com/



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# NIFA

### New PBCC project 2020-2025

When?	What?	Implications for PBCC?
Sept 2020	Existing project expires, new PBCC project Oct 1, 2020 -2025	Opportunities for building on PBCC's experience & accomplishments

Writing Committee: Michael Kantar(Chair), Ksenija Gasic, Kate Evans, Patrick Byrne, Wayne Smith, and Richard Pratt

Administrative Advisor: Robert Gilbert

NIFA Rep: Edward Kaleikau

### **New objectives**

- **1. Resource Analyses**: Collect, analyze, and disseminate data about U.S. public and private plant breeding efforts, including human capacity and access to enabling knowledge, technologies, germplasm, and infrastructure
- 2. Genetic Resources Conservation and Utilization: Promote the conservation, characterization, and utilization of plant genetic resources and access to those resources for plant breeding purposes
- **3. Education**: Explore the U.S. plant breeding education capacity across universities and identify potential gaps and ways of achieving more uniform teaching capacity
- 4. Communication: Improve communication [1] among public plant breeders and federal-state-local agencies on plant breeding policy issues, including alerts to existing and emerging threats to agricultural security that are relevant to plant breeding; [2] among public plant breeding programs and university administrators through enhancing the mission and impact of PBCC state representatives; and [3] between the plant breeding community and public audiences.

### New Project Timeline

Date	Activity	Who
August, 2020	Decide about new discrete projects for the renewal	Decided by PBCC leadership and membership
Oct, 2020	Decide on projects for the 2020-21 year	PBCC leadership
Jan. 2021	Finalize working groups for different projects	PBCC leadership
Feb. 2021 - onward	Start work on the new projects	PBCC membership