

Frederick S. Pardee Center  
for International Futures

# ANNUAL REVIEW

2021-2022



Josef Korbel School  
of International Studies  
UNIVERSITY OF DENVER



“IN THE END, THE PARDEE CENTER IS DEFINED BY THE COMBINATION OF A PARTICULAR RESEARCH ORIENTATION AND METHODOLOGY AND THE PEOPLE WHO CARRY OUT THE CENTER’S WORK. THE COVER ART FOR THIS REPORT REPRESENTS THIS ESSENTIAL CONNECTION.”

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## From the Director

### Dear Friends of the Pardee Center,

When I was first exposed to the work of Barry Hughes 18 years ago, it initially seemed like a fairly simple way to think about the long-term future. The International Futures (IFs) tool produced interesting forecasts and allowed users to explore systems and structures with ease. As I became more familiar with IFs, however, I soon realized that the long lines on graphs represented something much more complicated at work “under the hood.”

As I learned more about the IFs system, I was struck by two seemingly simple but powerful truths that anchor its approach to modeling—namely, (1) that our past, present, and future are deeply interconnected; and (2) things that are often studied in isolation are, in fact, deeply connected. As I came to better understand the ability of IFs to represent interconnections across broad topics and issue areas over long time periods, I became motivated to ask new questions about how such a tool could be used to help improve our thinking about the present and our planning for the future. I am still asking such questions as I seek to guide the work of the Center in my role as Director. My answers, which are evolving, are related not only to the connections within the IFs system but also

connections between groups of people with different perspectives and approaches as well as at different stages of their careers.

In terms of research methodology, we are primarily interested in understanding the world as an interconnected set of systems. We engage in integrated assessment modeling and its application to questions of sustainable human, social, and environmental development to create and reflect that understanding. We draw upon quantitative and qualitative approaches to build knowledge that we stitch together in one modeling framework.

In this Annual Review, we present brief vignettes of the research projects at the core of the Center’s portfolio over the past year. This year we have furthered our understanding of the impacts of COVID-19 on development, publishing work related to food security and the future of poverty. We have further developed data and methods to study international relations, publishing work focusing on China-U.S. power, heads of state travel, and other research products. Our policy-engaged scholarship has also continued, with publications studying the future of development in Uganda and Guinea Bissau. We do all this to contribute to how humans plan for and respond to an uncertain future—this is where we understand our impact to be.

In the pages that follow, we focus on the people of the Pardee Center as well as the projects—students, current staff, and also former staff who made special contributions to the Center’s development.

In the end, the Pardee Center is defined by the combination of a particular research orientation and methodology and the people who carry out the Center’s work. The cover art for this report represents this essential connection. The image symbolizes, first, the gathering together of the multiple subject area domains that feed the main tool for our work, the International Futures model. Second, the shape of the threads—the “S-curve” frequently used to represent technology diffusion in models—represents the progress we hope to catalyze through our work. And finally, the image also highlights the human agency involved in our work, as everyone at the Center has a “hands on” part to play in making the many kinds of connections that allow the Center to contribute knowledge to improve the human condition. We hope the various articles in this report help you learn more about our work and the people who are doing it.

A handwritten signature in black ink, appearing to read 'JDM' with a double dot to the right.

**Jonathan D. Moyer**  
Pardee Center Director



# PARDEE CENTER UPDATES

In this section, we share information about some of the important things that engaged us organizationally over the past year within the Center and our home at the University of Denver's Josef Korbel School of International Studies.

We also highlight recent work with our long-standing partner, the Institute for Security Studies, a pan-African think tank dedicated to furthering development and security issues across the continent.

On a sad note, we also include a memorial tribute to Frederick S. Pardee for whom the Center is named. Fred, who died in June of this year, made so many things possible for us through his generous gifts. We hope our tribute conveys some sense of the extraordinary person Fred was.



## Pardee by the Numbers

16

Sponsored projects



7

Clients



\$1.9

Million in sponsored research

2

Courses taught by Pardee Center faculty

## PUBLICATIONS

7

Journal articles

14

Reports

1

Book chapter

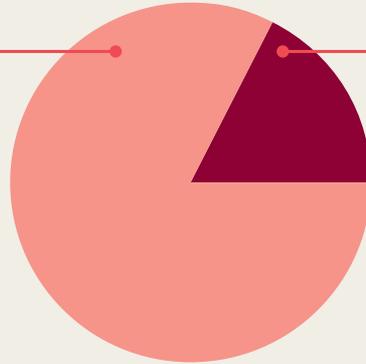
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Blogs

CORE TEAM MEMBERS

19

Full-time team members



4

New full-time team members

STUDENT RESEARCH AIDES

99

Student research aides



from

5

University of Denver Colleges and Schools





## In Memory of Frederick S. Pardee

Fred Pardee, for whom the Frederick S. Pardee Center for International Futures is named, died in June of this year. Fred was an extraordinary person whose personal commitment was, in his words, “to improve the human condition,” and he gave generously in support of that commitment.

The financial support that Fred provided to us beginning in 2004 made it possible for us to significantly improve and extend the poverty, education, health, infrastructure and governance models in the IFs system. It also funded the construction of an annex to the Korbel School to house the then-fledgling Pardee Center. Still other gifts allowed us to begin to build an endowment for the Center.

Financial support was only one of the ways that Fred connected with us. For example,

our five-volume Patterns of Potential Human Progress series funded by Fred included end tables with forecasts of more than 80 variables for over 180 individual countries and 22 global regions, and Fred himself prepared these tables.

Fred provided generous support to other educational institutions also, including the Frederick S. Pardee School of Global Studies at Boston University and the PhD program at RAND, Santa Monica (now the Pardee RAND Graduate School) where Fred was employed as an economic analyst from 1957 to 1971. He also funded the Frederick S. Pardee Library for the Future of Africa at the African Leadership Academy, a secondary school in South Africa that prepares students across Africa for future careers of leadership and service.

Fred received an honorary doctorate from Boston University in 2006 and from the University of Denver in 2013. He was insatiably curious and knowledgeable

across a wide range of topics and he loved lively discussion and debate. He had a particularly close relationship with Barry Hughes, who first met Fred at a meeting at RAND Santa Monica in 2002. Until close to the time of Fred’s death, he and Barry had regular Skype or, more recently, Zoom meetings. Fred also enjoyed visits to his home office in southern California from Barry and Jonathan Moyer and occasionally other Pardee Center team members and DU administrators. On the last visits to Fred in late 2021, they were joined once by Korbel School Dean “Fritz” Mayer and another time by DU Chancellor Jeremy Hefner.

Fred did so much to enable the Center to be what it is today and to participate in shaping our trajectory for the future. We are especially grateful that we were able to know Fred as a person and to have him as a friend.



# Implementing the Pardee Center Strategic Plan

## Year 2, Goal 4: Strengthening the IFs System

Because it is central to so much of the Center's work, the IFs system is constantly being "tended to" in one way or another. Much of this continual tending is, of necessity, related to the day-to-day requirements of current projects and/or addressing immediate problems in model behavior.

The purpose of Goal 4 of the Center's 5-Year Strategic Plan, however, is to look further out, both in terms of time and perspective, in order to strengthen the IFs system in ways that enhance its long-term viability. To give focus to this endeavor, a Model and Tools Strategic Plan Implementation Committee was formed in late September of 2021, followed by the formation of three task forces (modeling; interface and platforms; and documentation). After a series of meetings, the task forces presented reports to the Steering Committee which, in turn prepared a summary report for Center-wide dissemination.

The IFs system is currently available in two platforms for download and use on personal

computers as well as in a web-based version for use online. The downloadable versions currently operate in two stand-alone environments—a legacy vb6 version and a recently translated .NET version. The first recommendation of the Steering Committee was that the Center commit to a single stand-alone environment for all "power users" (designers, developers, and analysts), and it is this aspect of the IFs strategic plan implementation that is our focus here.

In March 2022, Pardee Center IFs users were asked to install the .NET version of IFs and to use it either alongside the vb6 version or in place of it to identify problems, issues, and strengths of the .NET version. Valuable feedback was gathered and evaluated over a multi-month period, subsequently leading to the conclusion that a full transition to the .NET version of IFs is in fact viable. Accordingly, in early July a goal was set of moving to .NET as the single IFs stand-alone platform by the end of December 2022.

Three interacting threads need to come together for this goal to be achieved. First, IFs developers will continue to build their proficiency with the .NET version (one is already using .NET exclusively, two are proficient in both platforms, and two more are actively coming up the learning curve). Second, analysts are migrating to the .NET version as they move to new projects. And third, the Center's lead systems analyst, with help from others as appropriate, has accelerated the translation of the small number

of most-frequently-used features that are not yet complete in the .NET version.

We expect the long-term benefits of this transition to be substantial. For users, they include faster run times (especially for long runs) and the production of high-quality visualizations. For those who tend to the systems at the model's core, they include the availability of support if needed (vb6 is no longer supported by Microsoft) and a full transition from Access to SQL, a more robust and also more secure tool for data transfer and processing. In the meantime, because we know that system transitions of this scale are usually at least somewhat disruptive while they are taking place, efforts are being made to provide needed support every step of the way. We are grateful for the "can do" attitude of the Center's IFs developers and users!

### GOAL 4

**Strengthen the IFs system**, linked to appropriate data and other Pardee Center tools, and enhance its long-term viability

**Subgoals:** The model; modeling team and personnel; processes; and awareness, perception, and use.

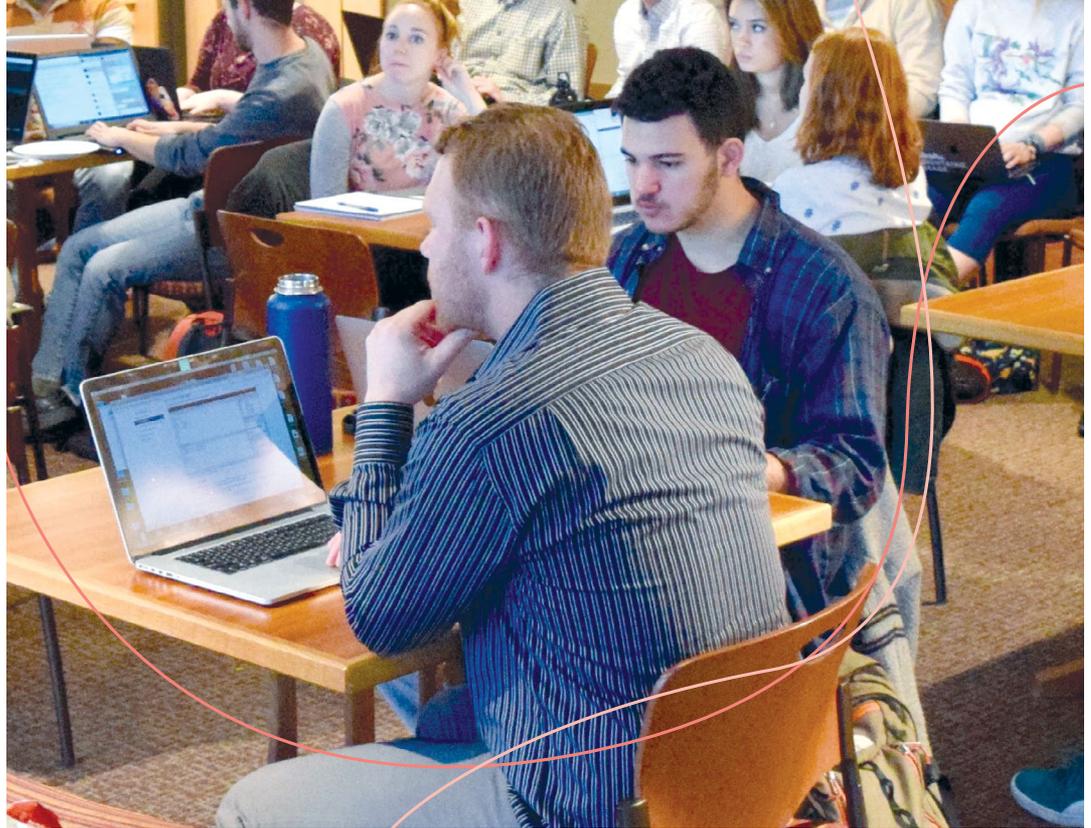


## New Courses for the Korbel School Curriculum

A number of courses that are closely aligned with the work of the Pardee Center have been taught at the Josef Korbel School of International Studies, our home, over the last four decades. These include *Development Forecasting with IFs*; *Global Change: Issues, Systems, and Dynamics*; *Global Megatrends*; *International Futures*; *Millennium Development Goals*; *The Art of Forecasting*; and *The Sustainable Development Goals*.

During this academic year, Pardee Center Director Jonathan Moyer is launching new courses designed to prepare students at both graduate and undergraduate levels to consume, and also to produce, model-based analysis focused on pressing development issues.

The courses focus on four core concepts or perspectives, all of which connect with systems thinking. First, they are rooted in a capabilities approach which very broadly construes development as a multidimensional system that includes individuals, groups, and the environment. Next, the courses are focused on “integrated analysis,” an approach that uses an interdisciplinary lens to understand how the world works. Third, the courses speak to the importance of interconnections across past, present, and future, rooting students’



understanding of the world in an epistemology that integrates across time. Fourth, students will learn about quantitative tools that can help further their ability to do development work in an integrated way.

These concepts and methods will be applied to case studies in which students explore the implications of integrated analysis for our world. In Professor Moyer’s words, “We will study the relationship between economic growth, climate change, and the future of poverty, striving to find a balance for human wellbeing in a rapidly changing world. We will analyze pandemic policies, trying to find a balance

between shutting down economic systems and protecting human life, acknowledging the high possibility of unintended consequences. And we will explore questions of food security, highlighting how balanced approaches that consider demand as well as supply can lead to the best long-term outcomes.”

Students will then be challenged to write about what they have discovered for a real-world policy audience, focusing on the broad policy strategies that make sense as humans struggle to make effective decisions in a world characterized by complexity and uncertainty.

## The Pardee Center's Role in DU's Transition to R1 Status

At the end of 2021, the University of Denver was designated as a Research 1 (R1) university—the level of highest recognition for research and scholarly activity—in the Carnegie Classification of Institutions of Higher Education. The designation is based on seven metrics of research productivity ranked and compared across all institutions in the United States (examples include research volume, number of PhDs graduated annually, and number of post-docs). At the time, only 136 other institutions in the United States were so recognized.

Few people are aware of the two-pronged role the Pardee Center played in the University's climb to R1 status.

The first role was Pardee Center Director Jonathan Moyers' participation in a small group of faculty who, during the period from 2013–2015, helped me explore this question about research: “Can DU be more?” When data from the University's Office of Institutional Research suggested the University had a foundation in place to answer that with a “Yes,” the follow-on question that Jonathan and others in this small group helped me address was “What will it take to get there?” A plan emerged with two

components: (1) significantly increasing the overall number of faculty engaged in sponsored research; and (2) increasing the research volume of each of the University's largest research centers, of which the Pardee Center was one, to \$2 million annually.

The speed of the University's transition to R1 status was remarkable. One facet of the transition was a very large increase in the number of faculty with external awards—from about 120 principal investigators in 2013 to approximately 275 in 2021. A second facet was the growth in sponsored research expenditures in each of the University's largest research centers. The Pardee Center rose to this challenge and first surpassed the target of \$2 million annually in 2017. Along the way, Jonathan provided, and continues to provide, critical insights to me and to others on how to improve the University's contracts and grants infrastructure.

The University has benefitted greatly from the University's transition to R1 status. For example, the University research community enjoys a higher level of instantaneous credibility with sponsors, the media, government agencies, prospective faculty, and prospective students. In addition, the research portfolio of the Pardee Center is squarely aligned with the University's commitment to public good. I am immeasurably grateful to Jonathan and the researchers of the Pardee Center for their thought leadership, execution of growth, and for believing in me, in DU, and in themselves.

Research at DU is not done growing. As the University makes research a part of its central brand, dramatic growth is unlikely to slow. My office and the Office of Research and Sponsored Programs have our work cut out for us. We will strive to match the innovation and hustle of the Pardee Center so that we do our part to create an environment in which research faculty, staff, and students all thrive and DU can maintain this incredible trajectory.

### Corinne Lengsfeld

Senior Vice Provost for Research and Graduate Education, University of Denver





# News from Our Partnership with the Institute for Security Studies

## Africa's Tomorrow: A Platform of Hope and Potential

On June 22, 2022, the Africa Futures and Innovation Program at the South African office of the Institute for Security Studies (ISS) hosted the launch of a new website on the long-term future of Africa. With more than 4,500 charts and almost a million words of text, the site relies on the International Futures system of models for its analysis of the long-term development prospects of each African country, region, and income group. The development and implementation of the website reflects a decade-long partnership of deep institutional collaboration between ISS and the Pardee Center.

The launch event was hosted by South Africa's largest online media network, the Daily

Maverick, and featured introductory remarks by South Africa's President Cyril Ramaphosa, who commended ISS for its efforts to assist in informing Africa's development. The event included participation by the newly appointed Chief Executive Officer of the AUDA-NEPAD secretariat, Ms Nardos Bekele Thomas, and by Professor Jonathan Moyer from the Pardee Center and Jakkie Cilliers, the Head of the Africa Futures and Innovation program.

The website is designed to provide policy guidance and assist in planning and decision-making by providing all interested individuals and organizations with integrated forecasts

of Africa's development prospects and potential within the timeline of Agenda 2063, the long-term development plan of the African Union. The modeling done for the site consists of eleven sectoral scenarios for each of Africa's 54 countries for which IFs has data, and the scenarios range from the impact of interventions to facilitate Africa's demographic dividend to the impact of the full implementation of the African Continental Free Trade Area. The African futures website can be accessed at [futures.issafrica.org](https://futures.issafrica.org).

### Jakkie Cilliers

Founder of the Institute for Security Studies and Head of the Africa Futures and Innovation Program





# OUR RESEARCH PORTFOLIO

I am proud to introduce this section in which we briefly describe our research output over the past year! As always, the research conducted at the Pardee Center is a collaborative effort that requires a range of technical skills and disciplinary foundations.

We have organized this section to reflect the two main foci of our work—the first engaged

more with issues of sustainable development and the second focused on geopolitical analysis and international relations. Both had their genesis in the work of Barry Hughes and early versions of the International Futures (IFs) model.

Our research focused on sustainable development connects to questions at

the core of integrated assessment modeling and to original work lead by Barry. Our work in this area was significantly enhanced by Frederick S. Pardee, whose generosity allowed us to extend the capabilities of IFs to include fully developed and interconnected models of poverty, education, health, infrastructure, and governance.



Both Barry and I have PhDs in International Relations, and academic threads from this foundation are evident in the Center's geopolitical analysis and international relations research. Both of us have long been interested in the ways that integrated assessment models can help inform thinking about the long-term structure of the international system.

Our geopolitical analysis/international relations research has a large data-building component that we are increasingly threading into the IFs system. In fact, the futures of sustainable development and geopolitics are fundamentally connected and we are increasingly exploring

those connections in our work. Our current focus is on bilateral models of trade, aid, arms, and migration endogenously connected to the core IFs system that forms the backbone of our sustainability analysis.

I hope you find it interesting to read about the research projects that occupied us over the past year. At the end of each brief description, we've included key words that hopefully help to make clear what it is that we actually *do* and the similarities and differences across our work.

**Jonathan Moyer**





Finally, the past year has reflected a continued focus on increasing the reach and accessibility of our sustainable development research. This year we brought our work in front of global audiences of stakeholders at all levels and from Stockholm to Riyadh to Almaty. We offered a wide variety of trainings to build capacity and relationships with researchers in Uganda and government workers in Bissau, while also building capacity within the Pardee Center with a new IFs-focused team of research aides. And we improved the accessibility of the model and supporting materials—for example, this year IFs was translated into Portuguese to become the first (and hopefully not the last) non-English version of International Futures.

## Development Analysis

The Pardee Center’s sustainable development research is oriented around exploring the dynamics of highly-integrated human, social, and natural systems and then helping stakeholders leverage this knowledge to improve human development. Over the past year, we have used this systems framework and innovative applications of the International Futures model to continue to address new research questions. These questions span in scale from the global (*How is the COVID-19 pandemic likely to affect food security at a global scale in the long term?*) to the regional (*How can Central Asia leverage pandemic recovery into sustainable*

*development?*) to the country-specific (*What are the prospects for recovery in a post-conflict Yemen?*) and to the subnational (*How will the pandemic-induced school closures in Uganda affect education at regional levels within the country?*).

In addition to asking new questions, we’ve also been building out the IFs model itself. New poverty levels and national poverty lines, disaggregated by age-sex groups, allow us to explore the future of poverty in a much more nuanced way. Improvements in how we model and forecast undernutrition offer new insights into how inequalities exacerbate food insecurity. And new variables—like age of marriage—will allow us to ask more policy-relevant questions and offer insights into the nexus between sustainable development and human rights.



**Taylor Hanna**  
Associate Director of  
Development Analysis



**Willem Verhagen**  
Research Scientist

NEW POVERTY LEVELS AND NATIONAL POVERTY LINES, DISAGGREGATED BY AGE-SEX



## EC/EPRC UGANDA

### Subnational Development and Forecasting in Uganda



The goal of this project is to support Ugandan policymakers and development practitioners by helping them understand pressing development trends at a subnational scale. Funded by the European Commission, the Pardee Center is collaborating with the Economic Policy Research Centre (based at Makerere University in Kampala) to improve foresight capabilities in Uganda and to explore key questions about the future. In collaboration with EPRC, we have completed two of four planned Policy Notes analyzing how the effects of the COVID-19 pandemic are likely to be felt across the country's development systems over coming decades (*Potential Long-term Effects of COVID-19 on Economic and Human Development in Uganda, and The Potential Subnational Effects of COVID-19 on Education in Uganda*). Additional analyses of subnational demographic trends and the effects of early marriage are forthcoming.

As a part of this project, we are expanding the IFs model to incorporate a measure of age of marriage in order to better understand how early marriage affects fertility and girls' education within a population. Finally, this collaboration includes a heavy focus on training and capacity building to ensure that the forecasts and analysis are accessible and useful to policymakers and practitioners. In the fall of 2021, Pardee Center

team members led an intensive 10-week online training course with EPRC researchers and Ugandan stakeholders and a three-day intensive in-person workshop was held in the summer of 2022 to provide more hands-on IFs training.

**ACTIVITIES:** Data building; Forecasting and scenario analysis; IFs development; Literature review; Policy notes; Public events/presentations; Training/capacity building

## UN WOMEN 'Genderizing' IFs



The Pardee Center has been collaborating with UN Women for more than two years to extend the capacity for gender-aware forecasts in the IFs model. The initial phase of that collaboration included breaking out extreme poverty forecasts into age-sex groups, for the first time allowing analysis in IFs of the gender gap in poverty.

Over the past year, we added age-sex distinctions to additional poverty thresholds: the international lower-middle-income country threshold (\$3.20/day), the international upper-middle-income country threshold (\$5.50/day), and a new measure of individual countries' national poverty lines. These additions have opened the door for a greater understanding of how policies and crises affect women in poverty specifically, as well as allowing a more tailored poverty analysis for individual countries. In the coming year, we look forward to continuing to

work with UN Women to further 'genderize' IFs and improve our analyses across the board.

**ACTIVITIES:** Data building; IFs development

## UNDP CENTRAL ASIA

### COVID-19 Recovery to Accelerate Development in Central Asia



Countries in the Central Asia region were hit hard by the COVID-19 pandemic and were especially vulnerable to negative impacts due to a crash in oil prices and economic shutdowns in neighbors China and Russia. Even while growth has rebounded across the region, countries must still address pre-existing development challenges, including dependence on oil, governance issues, and a high vulnerability to climate change. This project aimed to assess the pandemic's long-term effect on development and prospects for policy strategies to accelerate development beyond recovery.

The project was part of a large-scale effort, driven by UNDP and funded by the European Commission, to set up a Sustainable Development Knowledge Platform for Central Asia with the goal of aligning COVID-19 response strategies with the SDGs and Agenda 2030. Within the project, International Futures scenarios and analysis provided a macro-level understanding of policy tradeoffs and synergies, supplemented in the broader project by analysis of specific country-level programs and results.

The International Futures scenarios were created to reflect country recovery strategies and refined through a series of trainings and consultative webinars with UN Country Teams, researchers, and stakeholders. Final scenarios and results from the project were presented at the Second Regional SDG Summit held in Almaty, Kazakhstan in June of 2022 and will be published in a forthcoming report later this year.

**ACTIVITIES:** Forecasting and scenario analysis; Literature review; Public events/presentations; Training/capacity building

## UNDP GUINEA-BISSAU

### Green Growth in Guinea-Bissau



The Pardee Center is working with UNDP Guinea-Bissau to study possible pathways and impacts of green growth strategies for the country's economic and human development. The project consists of two reports and a series of workshops on the IFs model to build in-country capacity. In March 2022, we launched the first report. That report looks at economic and human development trends to 2040 under a Business as Usual scenario. It shows that while Guinea-Bissau is able to make progress across many development indicators under this scenario, many of the existing challenges remain and continue to slow down development over that period. As a result, with remaining high levels of inequality, a non-diverse economy, and high levels of political instability, more people might

live in extreme poverty in 2040 than today. The report is produced in English, French, and Portuguese.

In addition to the report, we also hosted a report launch and workshop in Bissau in March of 2022. The 5-day workshop focused on the use of the IFs model in Guinea-Bissau and was attended by 25 professionals from different ministries, NGOs, academia, and other organizations. In addition, a participatory session focused on co-creation of scenarios on green growth for the second report. As part of the workshop, the IFs model can now also be run in Portuguese, expanding the usability of the tool to Portuguese-speaking countries.

The Pardee Center and UNDP will launch the second report in the fall of 2022. The report will explore alternative trajectories of development by integrating green growth and human development with a focus on the cost of not going green. This report launch will be accompanied by a second in-country workshop on applying the IFs model in Guinea-Bissau.

**ACTIVITIES:** Data building; Forecasting and scenario analysis; IFs development; Public events/presentations; Reports and blog posts; Training/capacity building

## UNDP IFs RESOURCE TEAM SUPPORT

### Updating the SDG Push



In response to the COVID-19 pandemic, UNDP and Pardee Center researchers began work to better understand the long-term consequences of the pandemic on human and economic development. This work culminated in a series of reports that included the foundational research report, *Pursuing the Sustainable Development Goals in a World Reshaped by COVID-19*. This work looked not only at the effect of the pandemic but also at how the world could move beyond recovery by implementing a strong policy push toward sustainable development (the SDG Push scenario).

Over the past year, UNDP has been working with our IFs Resource Team—a team of research aides focused on learning and working with the IFs model—to update the SDG Push scenario. The IFs Resource Team has incorporated newly available data and analysis from UNDP and expanded the scenario to include the effect of achieving vaccine equity. Results from the updated study will be made available online on the UNDP's Data Futures Platform.

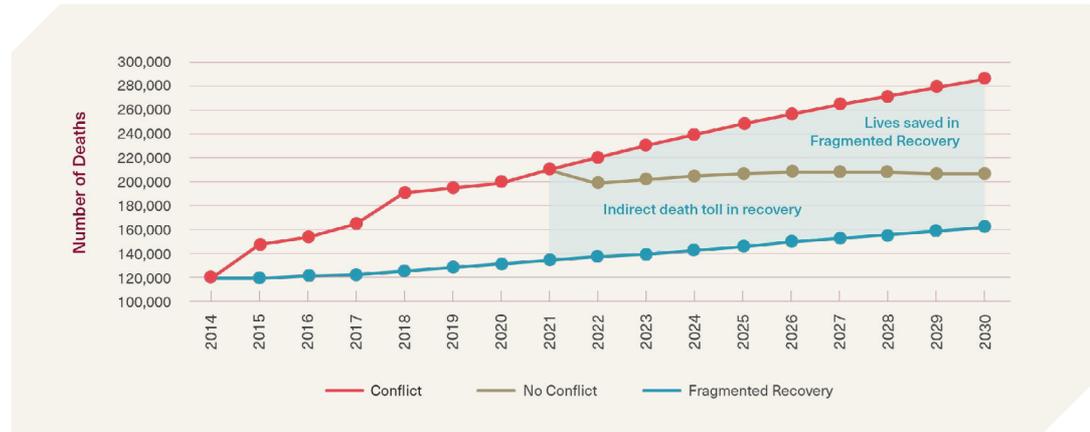
**ACTIVITIES:** Forecasting and scenario analysis; Report



Figure 1

**Total deaths in Yemen in the Fragmented Recovery scenario compared with the Conflict scenario (lives saved) and the No Conflict scenario (lingering indirect death toll of conflict).**

Source: IFs 7.67



## UNDP YEMEN

### Impact of War and Recovery in Yemen



In November of 2021, we published the third and final report in our Impact of War trilogy, a collaboration with UNDP Yemen. This collaboration has enabled groundbreaking research using integrated assessment modeling to evaluate the economic and human cost of an ongoing conflict. This latest report, *Assessing the Impact of War in Yemen: Pathways for Recovery*, updates earlier cost of conflict estimates using new data to understand how the war's effect has worsened over the past two years. With that as a background, the focus of the work is on charting pathways for recovery and simulating how a successful peace, combined with an integrated recovery, can bring Yemen back within a generation to its previous development path.

Upon publication, this research was presented at high-profile rollout events designed to spread awareness of the research and the continuing conflict to stakeholders, donors, and the general public. Rollout and launch events were held in Brussels, Denver, New York City, Riyadh, and Stockholm and involved participation by leading researchers and high-ranking government officials.

**ACTIVITIES:** Forecasting and scenario analysis; Literature review; Public events/presentations; Report

## USAID FOOD SECURITY

### The Future of Food Security



The Pardee Center is working with USAID to understand long-term trends in food security and the

impacts of COVID-19 thereon. In November of 2021, we published a joint report looking at the impacts of COVID-19 on extreme poverty, undernourishment, and child stunting through 2040 and the specific pathways through which these effects are manifested. Overall, the study highlighted the real risk of long-term negative effects of COVID-19 on food security relative to a world without COVID-19 and the impacts thereof on household income, consumption patterns, and diets. The work was presented to diverse USAID bureaus and centers as well as to country offices, such as USAID Uganda.

In the Spring of 2022, the collaboration with USAID was continued. The new collaboration focuses on updating the COVID-19 analysis with the newest data and insights related to economic growth, inequality, and education. The second phase also expands the collaboration with USAID into new domains.

With USAID's Center for Water Security, Sanitation, and Hygiene, we are working on updated projections of access to water and sanitation. These updated projections will be used in trainings to build in-house capacity at USAID to perform analysis on country level trends in access to water and sanitation and the possible benefits of increasing access. The second phase also aims to quantify the possible impacts of climate change on future patterns of poverty and will provide a scoping document on the humanitarian aid—development nexus.

Together, this work will result in a series of reports and blog posts, presentations to USAID, and trainings for USAID staff on applying the IFs model in their work.

**ACTIVITIES:** Data building; Forecasting and scenario analysis; IFs development; Literature review; Public events/presentations; Reports and blog posts; Statistical Analysis; Training/capacity building

## USAID UGANDA

### Evaluating Policy Choices in Uganda



The Pardee Center has been working with USAID Uganda for more than seven years, providing long-term forecasting and analysis of the country's development trajectory and supporting USAID's Country Development Cooperation Strategy

(CDCS). As the USAID office prepared to develop their new CDCS plan in 2021, we again supported that process through forecasting and scenario analysis of potential policy packages. In addition to playing an integral role in programming strategy at USAID, this analysis was published as its own report (*Advancing Development in Uganda: Evaluating Policy Choices and Their Long-Term Impact*) on the Social Science Research Network

In the past year, we also began work supported by USAID Uganda to do in-depth analysis on the long-term effects of country-wide school closures that occurred in response to COVID-19. Our forthcoming report will explore the grade-level implications of this shock to education and possible strategies to recover and close education gaps.

Engagement with USAID Uganda has also supported two blog posts: *How Good Governance Can Progress Uganda's Sustainable Development Goals*, published on "Africa at LSE" (the London School of Economics platform for analysis on African affairs), and *Re-imagining Sustainable Development Goals through an Integrated Systems Lens*, forthcoming.

**ACTIVITIES:** Forecasting and scenario analysis; Literature review; Reports and blog posts

## USAID UKRAINE

### Forecasting Scenarios for Ukraine



Since the fall of 2020, Pardee Center researchers have been working with implementing partners at EnCompass LLC as part of a monitoring and learning support mission for USAID/Ukraine. Until Russia's February 2022 invasion of Ukraine, we worked to track Ukraine's past and plausible future progress toward its 2019–2024 Country Development Cooperation Strategy objectives across alternative scenarios. This past year, our efforts included an updated scenario surveillance analysis report and an analytical brief examining China's influence capacity in Ukraine.

In light of recent developments, our team is coordinating with USAID to shift our analytical focus to better support USAID's evolving mission in Ukraine. While the future is uncertain, we remain committed to the Pardee Center's longstanding goal to improve the human condition.

**ACTIVITIES:** Forecasting and scenario analysis; Report



## Geopolitical Analysis

Through data building, tool building, and analysis, researchers at the Frederick S. Pardee Center for International Futures seek to quantify and track political, cultural, economic, and security-related trends within countries and interactions across them. Our team specializes in the creation of boutique data sets, which range from macro-level diplomatic exchanges and military developments to micro-level government leader travel and perceived mass atrocity events. We then qualitatively and quantitatively analyze these data in an effort to more accurately characterize the past, present, and plausible future of the international system.

We also specialize in the creation of indices to measure previously unmeasured phenomena at the global scale, including our Formal Bilateral Influence Capacity (FBIC) Index—a widely-used composite index of relational power between more than 200 countries from 1960 through 2020. Presently, our team is developing long-term forecasts of the FBIC Index and its subcomponents to allow analysts to model geopolitical spheres of influence through mid-century across alternative scenarios.

Over the past year, the hard work and dedication of several full-time staff members and more than 60 research aides have supported the Center's geopolitical analysis projects. Since the creation of the program at the center of our geopolitical analysis efforts, Diplometrics, a decade ago, hundreds of student researchers have leveraged



their talents to make this work possible. During this time, we have benefitted from the financial support of several organizations across the U.S. government, including the National Intelligence Council and the former U.S. Army Future Studies Group. Across sponsors, the Diplometrics mission has remained the same: to better understand, measure, and forecast international relations.

In the future, our team will seek to continue to advance the reach and impact of its geopolitical analysis. We expect the following projects and related efforts to serve as the foundation for these efforts.



**Collin Meisel**  
Associate Director of  
Geopolitical Analysis

OUR TEAM  
SPECIALIZES IN  
THE CREATION OF  
BOUTIQUE DATA  
SETS, WHICH  
RANGE FROM  
MACRO-LEVEL  
DIPLOMATIC  
EXCHANGES  
AND MILITARY  
DEVELOPMENTS  
TO MICRO-LEVEL  
GOVERNMENT  
LEADER TRAVEL

## CORE DIPLOMETRICS



Well before the founding of the Frederick S. Pardee Center for International Futures, the International Futures (IFs) tool was first used in the study and forecasting of geopolitical trends. Examples include Founder Barry Hughes’s *World Futures: A Critical Analysis of Alternatives* as well as his extensive support for the U.S. National Intelligence Council’s *Global Trends 2020* report, published in 2004, and follow-on reports in that series.

Approximately ten years ago, geopolitical analysis at the Frederick S. Pardee Center for International Futures became a central feature of our teams’ work outside of IFs as well in the form of the Diplometrics research program. This work began with the construction of three data series—diplomatic exchange via embassies, membership in international governmental organizations, and signing and ratification of multilateral treaties—which we now refer to as “Core Diplometrics.” Although Diplometrics has expanded substantially to include the projects

featured below, these Core Diplometrics data series remain at the heart of the Pardee Center’s geopolitical analysis and index construction.

Maintained and updated each year, the Pardee Center shares its Core Diplometrics data freely with academic researchers, think tanks, and the public. Most recently, our data on diplomatic exchange were featured in the Brookings Institution’s *Foresight Africa 2022* report which highlighted the surging diplomatic presence of countries such as Turkey on the African continent.

**ACTIVITIES:** Forecasting and scenario analysis; IFs development

## COUNTRY AND ORGANIZATION LEADER TRAVEL



An ambitious effort involving more than two dozen research aides led by Research Associate and Project Manager Alexandra Kurkul, the Country and Organization Leader Travel (COLT) team tracks every known,

observed overseas trip by roughly 200 countries’ priority government leader in near-real time. Extending from 1 January 1990 through last month—with plans to continue to update the data monthly thereafter—COLT now includes approximately 90,000 travel events involving roughly 3,000 world leaders.

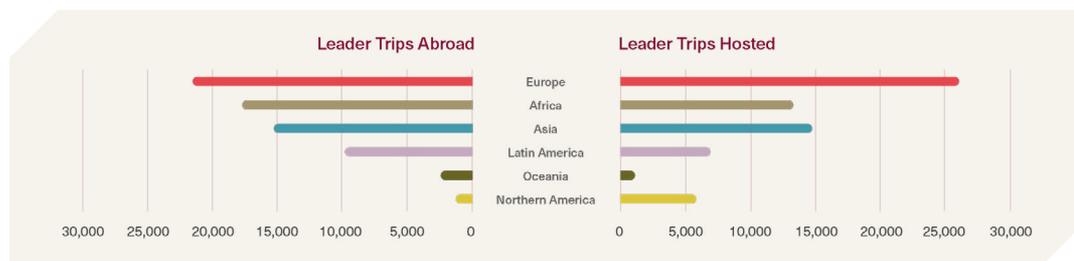
Over the past year, the COLT team has formalized the expansion of its travel and accompanying leader biographies and education datasets by including monthly updates for foreign-, defense-, and finance-minister-equivalents for all Group of 20 member countries from 1 January 2018 onward. To our knowledge, COLT comprises the world’s largest single collection of information on government leader travel, a unique asset which we are seeking to leverage through ongoing academic studies and analytical reports.

**ACTIVITIES:** Data building; Data visualization; Literature review; Statistical analysis

Figure 2

### Heads of government and state travel abroad and hosted by region, January 1990 through June 2022

Source: COLT dataset





## FORMAL BILATERAL INFLUENCE CAPACITY



As the result of more than a decade of geopolitical analysis at the Pardee Center, and now a driver of much of its current geopolitical research agenda, the Formal Bilateral Influence Capacity (FBIC) Index seeks to describe bilateral and networked influence dynamics in the international system. Through subcomponents described as bandwidth—or the size of the interaction between countries—and dependence—or the asymmetry of that interaction relative to a country’s full set of bilateral interactions worldwide—the FBIC Index reflects the reality that globalization and interconnectedness can be both an asset and a liability in the pursuit of a country’s national interests. In the language of international relations theory, the FBIC Index measures the capacity for weaponized interdependence among geopolitical rivals.

Over the past year, the FBIC Index has been updated to include historical data from 1960 through 2019 for roughly 40,000 country-pairs. Soon these data will be updated through 2020.

Figure 3

### Network graph of Formal Bilateral Influence Capacity in the international system, nowcast for 2022

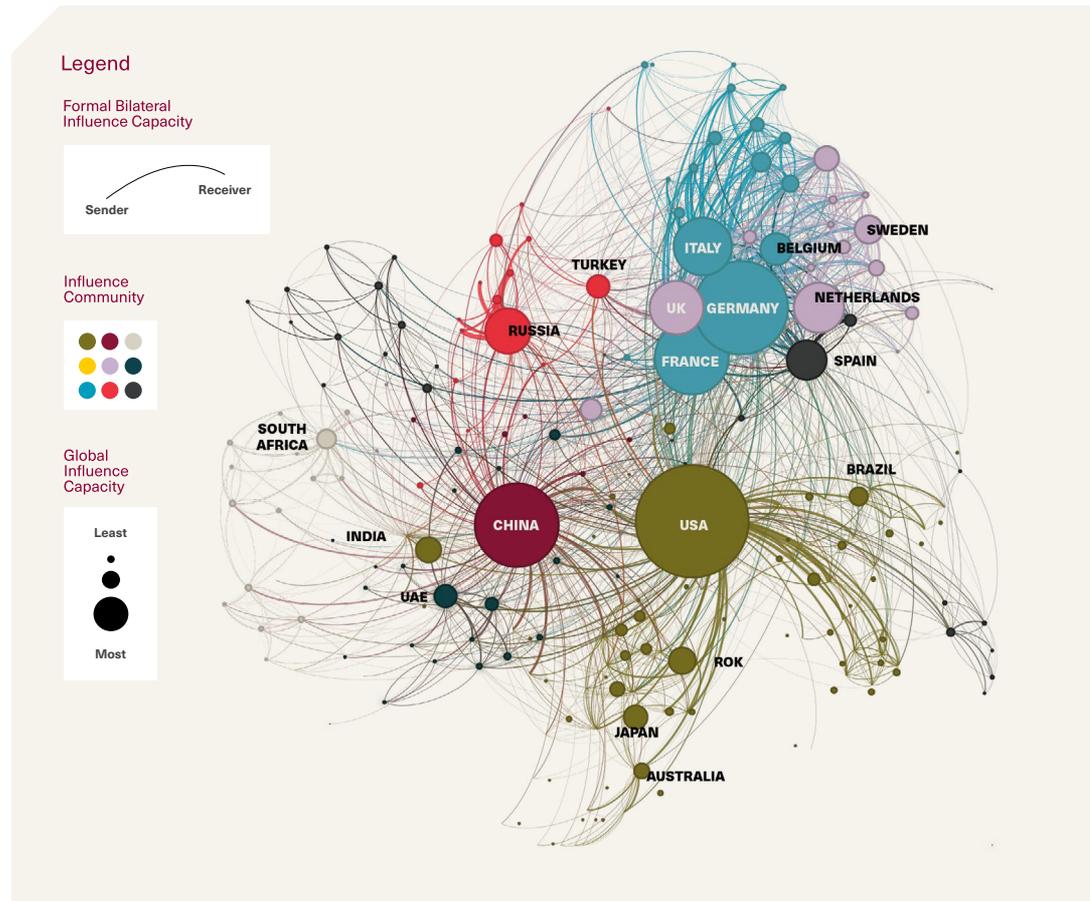
Source: FBIC Index

Meanwhile, our team has developed preliminary forecasts for the FBIC Index and its political, economic, and security-related input variables. The result is a one-of-a-kind measurement of likely future spheres of influence which we can compare across alternative scenarios and draw implications from for academics, policymakers, and publics seeking to better understand and perhaps shape their spheres of interest.

We also continue to explore the statistical relationships between influence capacity and

other core international interactions, such as goods trade, and geopolitical events, such as intrastate conflict. This has led to several conference papers, policy briefs, and academic manuscripts in progress.

**ACTIVITIES:** Data building; Data visualization; Forecasting and scenario analysis; IFs development; Literature review; Statistical analysis



## GLOBAL INDICATORS OF DYADIC ENGAGEMENT



A common refrain among quantitative analysts is the “80/20 data science dilemma,” where 80 percent of an analyst’s time involves gathering and cleaning data with only 20 percent of their time being left for analysis. To streamline our research team’s efforts and allow for more time conducting analysis, we have developed an in-house dataset known as the Global Indicators of Dyadic Engagement (GIDE). GIDE brings together a panel of roughly 200 country-level and bilateral annual indicators for approximately 40,000 country-pairs for the years 1960 through 2019.

A truly massive resource for international relations analysis, GIDE serves as the foundation for much of the Pardee Center’s historical geopolitical research, particularly that involving multivariate regression and network analysis. GIDE provides the input data for the FBIC Index and is expected to house other indices currently under development.

**ACTIVITIES:** Data building; Literature review; Statistical analysis

## INTERNATIONAL NONGOVERNMENTAL ORGANIZATIONS



In recent decades, geopolitics has become increasingly shaped by non-state actors. While violent non-state actors often receive attention for their roles in shaping the international system, many other types of actors deserve scholarly attention. To that end, our International Nongovernmental Organizations (INGOs) project collects data on the extent and intensity of major INGOs across the world since 1990. This project tracks both the programmatic operations and source support from countries of operation for each INGO examined.

In 2021, our team updated the INGOs dataset through 2020. Pardee Director Jonathan Moyer, former Pardee Research Scientist Austin Matthews, and Pardee Research Aide and Korb School PhD candidate Jen Evans also completed an academic manuscript, now under peer review, introducing the INGOs dataset to the academic community.

**ACTIVITIES:** Academic publication; data building

## NATIONAL POWER



The concept of power is central to the study of international interactions and the geopolitical circumstances they define. While measurements of power are imperfect—indeed, not all aspects of national power can be readily measured—they can provide a starting point for more extensive analysis or at least provide broad context for the state of power dynamics between countries.

The Pardee Center’s Global Power Index (GPI), which our team developed roughly a decade ago and continues to maintain and update, is central to our measure of national power via material capabilities. Over the past year, we also introduced a simplified measure known as the Diplomacy, Military, Economy (DiME) Index. DiME was recently used as part of a broader analysis of forecasted China-U.S. power dynamics across alternative scenarios, published online in May 2022 in the *Journal of Contemporary China*. These forecasts, as well as those for the GPI and another legacy index, the Herman-Hillebrand-Moyer Index, are available in the International Futures tool.

**ACTIVITIES:** Academic publication; Data building; Forecasting and scenario analysis; Index development; Literature review



## PERCEIVED MASS ATROCITIES DATASET



Reliable data sources cataloguing atrocities are crucial to advancing our theoretical understanding of such events. They are also valuable sources of information when considering policy interventions that can help prevent future occurrences. Until recently, however, data on less lethal atrocities—as in those other than acts of mass killings, genocide, and politicized—were lacking.

This past year, the Pardee Center team created what to our knowledge is the first worldwide dataset of lethal and less lethal atrocities: the Perceived Mass Atrocities Dataset. Our historical data, which include country-year indices of occurrence, magnitude, and prevalence for seven atrocity types, extend from 2018 through 2020 for 195 countries. Pending additional funding, we plan to extend these data through 2022 in the coming year and maintain annual publicly available updates thereafter. Through these efforts, we hope to honor victims by remembering their experiences and assisting academics, policymakers, and the public in learning to prevent similar events in the future.

**ACTIVITIES:** Data building; Index development; Literature review

## UNITED NATIONS VOTING PATTERNS



Outside the Core Diplometrics data series, one of the Pardee Center's longest running consecutive data gathering efforts for geopolitical analysis has been our team's cataloguing of United Nations (UN) voting patterns. We track recorded votes of resolutions in the UN General Assembly, UN Human Rights Council, and UN Security Council, calculating voting coincidence scores between countries and voting blocs in aggregate as well as for specific issue areas. These coincidence scores—or measures of agreement—provide a barometer for international relations generally and, more specifically, for points of contention in the UN.

In updating our UN voting data through 2021, we transitioned from a legacy data visualization tool to a new UN Voting Coincidence Dashboard, which is freely available on the Pardee Center's website. This new dashboard allows for quick, descriptive analysis of selected data as well as a full data download for those interested in completing more intensive statistical analysis.

**ACTIVITIES:** Data building; Data visualization

## LOOKING AHEAD

With the inclusion of bilateral forecasts for the FBIC Index and its subcomponents into IFs, the Center's geopolitical analysis efforts continue to be further integrated into our organization's broader work. Likewise, insights from the Center's sustainable development analyses continue to shape and guide the ways in which we think about long-term political trends, particularly future prospects for national power and influence. Pardee Center Director Jonathan Moyer's ongoing research into international power across alternative climate change scenarios epitomizes such work, as does the political analysis team's exploration of changes in power and influence as they relate to the long-term development, and recovery, of Ukraine.

**In Fall 2022, Pardee Center Research Scientist Austin Matthews is transitioning to a tenure track faculty position with East Carolina University's Security Studies program. We are excited about this next phase of Austin's career and look forward to engaging with his future research.**



# THE PEOPLE OF THE PARDEE CENTER

As the previous section describes, our work is based on specific research methodologies. However, those methodologies don't "do" the work. Many people engaged in different activities come together to create and use the research tools and databases that make our analytic work possible.

In this section we highlight many of these people: our Research Aide project leads; an alum; new core staff; legacy members of our team; and three individuals who were true innovators during their time with the Center. We also give a shout-out to three research aides who have been selected to participate in highly selective research and educational programs

and to three full-time staff members who are concurrently pursuing advanced degrees at DU.

We hope reading about these members of our team gives you some sense of the people at the core of all that we do.



## RA Project Leads

### Who Are They & What Do They Do?

The Pardee Center's research is immeasurably enhanced by the many dedicated and talented students who join the Center as research aides. Within this group, project leads are research aides who have applied and been selected to assist in managing and mentoring their peers at the Center. From delegating research tasks and monitoring research progress to acting as the subject matter expert for the team which they lead—whether it be data building, data visualization and analysis, literature review, or IFs model support—project leads are central to the Center fulfilling its research and educational mission. In turn, project leads gain real-world research and team leadership experience that they are able to apply in their future careers.

### GRADUATING PROJECT LEADS

Spring 2022



#### **Olivia Barrows**

MA International Studies

PARDEE PROJECT: Country Organization  
Leader Travel Team

*"Through its work with student research aides, the Pardee Center is creating a generation of researchers who respect the value of data to facilitate more responsible and equitable outcomes in the policy-making process."*



#### **Jen Evans**

PhD International Studies

PARDEE PROJECT: International  
Nongovernmental Organizations Team

*"The work of the Pardee Center increases our understanding of the world and helps improve policymaking amid changing global conditions."*



#### **Thomas Hadeed**

MA Global Finance, Trade, and Economic Integration

PARDEE PROJECT: Core Diplometrics Team

*"Intertwined with leading development organizations like UNDP and USAID, the Pardee Center is positioned well to conduct research and disseminate analysis to help shape policy that directly benefits individuals in need around the world."*



#### **Mark Meziere**

MA International Development

PARDEE PROJECT: International Futures  
Resource Team

*"The Pardee Center is an exceptional research center that is driven by its core values and a rigorous pursuit of knowledge. It provides a truly unique lens through which policymakers, researchers, and organizations are better able to understand the interconnectedness of the global systems and dynamics critical to their decision-making."*



**Wondemneh Pawlose**

MA International Development

PARDEE PROJECT: Literature Review Team

*"I believe that the Pardee Center works to connect various stakeholders through research conducted on many subjects. From development practitioners to policy makers, the work that we do at the Center has a big impact. It's also important to mention the impact Pardee has on students as it develops their research skills."*



**Lydia Taylor**

MA International Security

PARDEE PROJECT: Country Organization Leader Travel Team

*"At Pardee, we combine student ingenuity with the data we collect to create a better understanding of the changing ways in which our global community interacts."*



**Audrey Pirzadeh**

MA International Development

PARDEE PROJECT: International Futures Data Team

*"The Pardee Center produces valuable insights into the way economic, social, and political systems interact with each other to produce outcomes in the world. These insights help guide policy related to the global Sustainable Development Goals."*



**Natalie Wolder**

BA International Studies

PARDEE PROJECT: Country Organization Leader Travel Team

*"My research duties at the Pardee Center have aided me both in my professional and personal development through the opportunity to work with the COLT team and strategically focus on regions of interest."*



## INCOMING AND CONTINUING PROJECT LEADS

Fall 2022



### Daniel Cieraszyński

BA Business Analytics & International Studies

PARDEE PROJECT: Data Visualization and Analysis Team

*"I view the Pardee Center's work as a crucial tool for not only understanding our contemporary world but also as a quintessential method for being able to handle the challenges and trends of our future."*



### Kali Kyo

MA Global Economic Affairs

PARDEE PROJECT: Country Organization Leader Travel Team

*"The COLT project at Pardee brings interconnectedness to the forefront of world leaders and policy making. Through tracking leader travel, the Center is able to represent bilateral, regional, and international relationships in an organized fashion."*



### Charlie Lemke-Bell

BA International Studies & Public Policy

PARDEE PROJECT: Core Diplometrics Team

*"I believe that the work of Core Diplometrics and the Pardee Center can best be described as an effort to critically understand how we connect and interact with different countries and people around the world."*



### Celine Palmer

MA International Development

PARDEE PROJECT: International Futures Resource Team

*"The Pardee Center's work is a genuine service to the international system. Our approach ensures a multicultural outlook that considers the connections in various facets of society to make informed decisions for policymakers. It is a privilege to be a part of this space. The Center is heavily invested in growing future leaders."*



### Grant Powell

MA International Studies

PARDEE PROJECT: Country Organization Leader Travel Team

*"The Pardee Center provides unique and crucial insight into our interconnected world through cutting-edge work across diverse projects, providing tools to policymakers, academics, and many others."*



**Andres Pulido**

MA Global Finance, Trade, and Economic Integration

PARDEE PROJECT: International Futures Data Team

*“Since 2019, I have seen how Pardee contributes to a rich understanding of where 189 countries are and will go and what systems drive that reality. This in turn, informs client actions, through tailored scenarios, to advance shared prosperity.”*

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**Brenda Semerenko**

MA International Development

PARDEE PROJECT: Literature Review Team

*“The international system is complex, but the impact of the work at the Pardee Center compels us to reflect on global issues through various lenses. Through partnerships and engagement with various actors, the Center is committed to help solve the most pressing issues in the spheres of development and public policy.”*



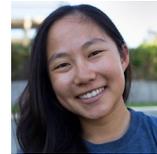
**Skyler Wilkey**

BA International Studies and Public Policy;  
MA in International Security

PARDEE PROJECT: Country Organization  
Leader Travel Team

*“One of the biggest impacts of our work is the way we inform governments, NGOs, and other clients on important trends in international relations. The broad array of research we do has the potential to educate a lot of people.”*

---



**Tiffany Zhang**

MS Data Science

PARDEE PROJECT: International Futures Data Team

*“The Pardee Center provides trend information to World Leaders about a country’s potential future growth or decline by modeling and visualizing metrics that impact sustainable development.”*



## Celebrating the Pardee Center's Research Aides

### FULBRIGHT PROGRAM

The Fulbright Program is a congressionally funded initiative created to foster mutual understanding and expand perspectives through academic and professional advancement and cross-cultural dialogue. Since its inception in 1946, the program has grown to operate in more than 140 countries with awards to scholars, professionals, teachers, and artists from around the world.

**Sophia McGrath** has received a Fulbright award to research the evolution of Turkish democracy at its centennial. Sophia will utilize her experience as a democracy analyst and campaign strategist to study Turkish democracy from its beginnings to the 2023 presidential elections as they unfold. She will be based at Koç University's Center for Research on Globalization, Peace, and Democratic Governance in Istanbul.

### RANGEL SUMMER ENRICHMENT PROGRAM

The Charles B. Rangel International Affairs Summer Enrichment Program is a six-week summer program designed to provide undergraduate students with a deeper appreciation of current issues and trends in international affairs, a greater understanding of career opportunities in the field, and enhanced knowledge and skills to pursue such careers. Students live at Howard University, attend classes, and participate in a variety of programs with foreign affairs professionals.

**Charlie Lemke-Bell** was chosen to be a Rangel Scholar in the 20<sup>th</sup> class of the Summer Enrichment Program. By the time this Annual Review has gone to press, he will have attended classes at Howard University focused on political economics and the history of foreign affairs. Moreover, he will have had the opportunity to engage with government and nongovernmental professionals at various agencies, companies, and think tanks in and around Washington, D.C.

### THINKSWISS RESEARCH SCHOLARSHIP

The ThinkSwiss Research Scholarship is a highly selective research program funded by the State Secretariat for Education, Research, and Innovation of Switzerland. It supports graduate and advanced undergraduate students in a research exchange at Swiss institutions.

**Andres Pulido** will be spending Fall 2022 at the Graduate Institute of Geneva where he will be researching the green bond market at the Centre for Economic Policy Research. While there, he will also engage in complementary coursework, further his French, and have the opportunity to be a United Nations COP26 Climate Change Conference Observer.



## Spotlighting a Pardee Center Alum

Kevin O'Connell

Korbel School alumnus and former Pardee Center Research Aide Kevin O'Connell is currently employed at the Center for Naval Analysis (CNA) which is the Department of the Navy's Federally Funded Research and Development Center (FFRDC). Kevin works as an Associate Research Analyst in the Center's Operational Warfighting division working on the Organizations, Roles & Missions team to improve the ability of the Navy and Marine Corps to organize, plan, train, and execute at the operational level of warfare. CNA has a long history with the Navy and continuously has analysts deployed on ships and bases both in the United States and abroad to collect data

and provide analytic support to Navy and Marine Corps forces. While Kevin's current station is at headquarters in Arlington, Virginia in a traditional research role, he will look to take on a field billet in the future.

While at the Korbel School, Kevin earned an MA in International Security specializing in Intelligence. He joined the Pardee Center during his first term at Korbel and worked on the Country and Organization Leader Travel (COLT) team as a research aide. As the COLT team and project expanded, he took on a project lead role for a pilot project scoping the feasibility of tracking the travel of foreign ministers, defense ministers, and economic representatives. Kevin led the pilot cohort until his graduation, at which time he transitioned to a more limited technical advisory role.

When asked about how his experiences at Pardee positioned him for taking on new opportunities and job roles, Kevin

EXPERIENCES  
AT PARDEE  
POSITIONED  
HIM FOR  
TAKING ON NEW  
OPPORTUNITIES  
AND JOB  
ROLES, KEVIN  
SHARED THAT...

shared that learning how to function in a professional research center/think-tank environment was valuable. Regarding advice for current Pardee research aides on their future endeavors, Kevin noted that their first job need not be career-defining. Reflecting on his own current role, which is his third since graduating, Kevin notes that it can take some time to figure things out. He suggested looking into FFRDCs for internships (CNA has some) and as potential employers. FFRDCs conduct critical research into a variety of topics and are seated at a unique intersection of the public and private sector. While FFRDCs are federally funded and work with federal sponsors/clients on issues important to the government, staff are not federal employees. In Kevin's opinion this provides the best of both worlds.



## Spotlighting New Research Team Members



### Alexandra (Alex) Kurkul

Alexandra Kurkul joined the Pardee Center as a Research Aide in October 2019 when she was a graduate student at the Korbel School. In October 2021, she transitioned to a staff position as Research Associate and Program Manager of the Country and Organization Leader Travel project within the Diplometrics Program. Alexandra oversees a team of approximately 35 research aides

in the collection, input, cleaning, and organization of data to construct a database of foreign travel by heads of government and state for over 200 countries from 1990 to the present, as well as travel by select intergovernmental organization leaders and country ministers. Her responsibilities include establishing data management processes and conducting qualitative and quantitative analyses of the associated bilateral and network interactions within the international system.

In addition to an MA degree in International Studies from the Korbel School, Alexandra holds a BA in Government and a BA in Psychology from Dartmouth College. Prior to attending graduate school, she spent six years in the private sector at a law firm in Boston, Massachusetts, where she helped individuals and corporate clients navigate the U.S. immigration system. During this time, she also volunteered at a national security think-tank that studies emerging threats in order to improve long-term policymaking. Outside of work, Alexandra enjoys running, snowboarding, reading, and exploring Colorado with her dog.



### Stellan Kwasi

Stellan Kwasi first joined the Pardee Center as a Research Aide during her time as a graduate student at the Korbel School from 2016 to 2018. In March of 2022, Stellan returned to the Pardee Center in a staff Research Associate position. Stellan uses the International Futures model to explore questions of policy and the future of sustainable development. Since returning

to the Pardee Center, she has analyzed and forecasted the future of development in Uganda, including by serving in a lead role for two studies assessing the long-term impact of COVID-19 on educational outcomes in the country at national and regional levels. She also supported an IFs training for researchers in Kampala.

Prior to her current role at the Pardee Center, Stellan worked at the Institute for Security Studies in Pretoria, South Africa. Her work mostly involved conducting studies on thematic issues and long-term development prospects at both country and regional levels to influence policymaking on the African continent.

Stellan's academic background includes an MA in International Development from the Korbel School and a BS in Agricultural Economics from Egerton University, Kenya. She is interested in quantitative research and its contributions to shaping policy and development of the African continent. Outside of work, Stellan likes to run, hike, and try new foods with friends.



### Deva Sahadevan

Deva Sahadevan joined the Pardee Center as a Research Associate in 2021. He works with the human development team and uses the International Futures (IFs) software and other quantitative modeling tools to contribute to the Pardee Center's portfolio of research projects and publications. Since joining the Center, his work has focused on assessing the long-term effects of COVID-19 on economic and human

development in Uganda. He is currently also leading an effort to bring a new variable into the IFs system to measure the effects of early marriage on development.

Prior to joining the Pardee Center, Deva graduated with an MSc. in Development Economics from the University of San Francisco, and a BA in Social Sciences from Tata Institute of Social Sciences, India. His master's thesis, titled "Transitioning into Retirement: Effect of Pension Expansion on Elderly Labor Force Participation," explored the causal implications of a social security program in India. Deva's professional experiences include stints with NGOs and development organizations in the field of economics, education, and agriculture.

Deva enjoys academic research focused on economics and development and hopes to continue growing and learning as a public welfare-centric researcher. In his free time, Deva enjoys reading philosophy, cooking, learning a language, and keeping up with sports.



### Adam Szymanski-Burgos

Adam Szymanski-Burgos began working with the Pardee Center in the Summer of 2020 as a Research Aide on the Country and Organization Leader Travel (COLT) project under the Center's Diplometrics program. The following year, he also joined the Data Visualization and Analysis Team. Adam's full-time staff role with the Center began in Fall of 2021. He currently works as a Research Associate, where his work involves

various aspects of the broad Diplometrics program. On a day-to-day basis, he is engaged with data management projects that support the Center's unique data building efforts and he also works on research projects in international relations and security.

Adam's academic background includes a BS in Political Science from Southern Oregon University and an MA in Economics from the Korbel School in the summer of 2021. Prior to joining the Pardee Center, Adam was an affiliate researcher with the Filene Credit Union Research Institute, where his work centered on the growing importance of credit unions for business and community development. Outside of work, Adam enjoys hiking, rock-climbing, and gardening. He also takes keen interest in languages and religious studies.



## Spotlighting Legacy Team Members

### Mohammad Irfan

**When did you first connect with Barry [Hughes]?**  
My first connection with Barry was in the fall of 1999.

**How did you learn about Barry and IFs? Were you already enrolled at DU or considering enrolling? What program? When did you complete your program?**

I came to know about Barry and the IFs model through the website of the Korbels School in the summer of 1999. I had been accepted into the MA in International Studies and I was exploring the school website in search of research projects that suited my interests and skills. I came upon this fascinating global model and had the pleasant surprise of discovering it had been developed using Visual Basic, a computer language I was using at the time. I came to Korbels and started working with Barry. I completed my MA in 2001 and subsequently was accepted into the PhD program at the Korbels School. I ended up developing a global education model in IFs that forecasts the progression of students through primary, secondary, and tertiary levels, as well as tracking the attainment of formal education by adults through their lifetimes. My dissertation involved using that model to simulate alternative paths to universal basic education. I completed my PhD in 2008.

**What were your first projects when you began working with Barry?**

As far as I can remember, I had to do some data work as my very first assignment with Barry. I also spent time in that early period working on forms and screens (e.g., a scenario tree and an MDG display) for the user interface.

**What are your major projects/activities now?**

I develop, maintain, and upgrade key areas of the model, including education, infrastructure, poverty, labor, and government finance. One example of my current activities is a revision of the IFs water and sanitation models from the current representation of three service categories to a more elaborate five-category representation. This is for a project the Center is doing with USAID. I am also involved in various other client projects and in manuscript preparation for reports and submission to journals.

**Over this whole period, what have you done in your work with the Center that you are most pleased about and/or enjoyed the most?**

I enjoy seeing the big picture. I like being involved in the process of taking a mental picture all the way to a computational model and knowing that the models we develop help policy makers and practitioners address important problems around the world. Like the others at the Pardee Center who have spent pretty much their entire working lives with the IFs model, I love every bit of the journey.

**What do you enjoy doing when you are not working?**

I like going on road trips with my family. I like reading good books.

**What is something about you that people at the Center may not know?**

I spent a full hour on this question. I could not think of anything.



**“Looking back, it seems amazing that Mohammad, José, and I have known each other and worked together for twenty-some years. IFs first moved beyond my solo efforts and out into the world because of them. I am incredibly grateful to them both.”**

**–Barry Hughes**

## José Solórzano

**When did you first connect with Barry [Hughes]?**  
I think it was December of 2000.

**How did you learn about Barry and IFs? Were you already enrolled at DU or considering enrolling? What program? When did you complete your program?**

I learned about Barry through Mario Lopez, a Computer Science Professor at DU, and Oscar Lopez, who was a TA for Mario at the time. I was not enrolled at DU but I was looking for a scholarship or financial aid to attend a graduate program in Computer Science or Software Development. I completed my MS in Computer Science in March of 2003 and then I decided to get another DU Master's degree, this time in Finance. I completed that second program in March of 2005.

**What were your first projects when you began working with Barry?**

My first projects were IFs interface related. At the time the Graphical User Interface (GUI) was part of the main IFs software. One of my first big projects was to break out the GUI as a separate object.

**What are your major projects/activities now?**

I provide leadership for Systems Development in a variety of ways, including interface related developments; the implementation and consolidation of model development changes and their translation to the .NET model; the creation of installation versions of IFs; helping

to guide the Modeling Pod which serves as the main point of interaction between developers, modelers and analysts; and participating on the Pardee Center Leadership Team to help the Center plan for and implement software development and to evaluate potential future developments.

**Over this whole period, what have you done in your work with the Center that you are most pleased about and/or enjoyed the most?**

I'm really satisfied about creating the Web version of the model, which gives us an online presence and an easy entry point for new users. I also enjoyed working on the development of the IFs Health Module where I learned a lot from my colleagues with more experience in the field. Finally, I'd say the translation of the vb6 model to .NET was my most challenging task. Because the main developer with whom we had contracted left midway through the project, I was called upon to complete that extremely complicated project. To me that was a huge accomplishment.

**What do you enjoy doing when you are not working?**

I love soccer, and still play once a week. I also like following professional sports on TV—soccer, basketball, and baseball.

**What is something about you that people at the Center may not know?**

I was born in Belgium when my father was getting his Master's at the University of Louvain. That's where I had applied to go when I got the



**“Looking ahead, José and Mohammad remain at the core of the Pardee Center's large-scale modeling work. All of us at the Center owe them a huge debt of gratitude for our ongoing journey with International Futures.”**

**—Jonathan Moyer**

opportunity to come to DU and that's the main reason I learned French. I went to watch some games of the Brazil World Cup in 2014 and that's why I learned Portuguese. I had also attended some World Cup games in the U.S. back in 1994 and I was there when Brazil won its 4<sup>th</sup> championship vs. Italy.



## Staff Scholars

Three of the Center's full-time team members are pursuing, or have recently completed, advanced degrees. We want to take a moment to give each of them a shout-out. As many of us know, it takes dedication and stamina to concurrently work and study! Here's to Anajulia, Cory, and Yutang.



**Anajulia Barney**, the Pardee Center Contract and Business Manager, completed her MBA with a certificate in corporate finance from the University's Daniels College of Business in August. Anajulia noted that while she had been motivated by a desire to improve her quantitative skills in the area of finance, she also especially enjoyed courses in strategic management and leadership.



**Cory Vandenberg**, a Pardee Center Systems Developer, is pursuing an MA in International Security from the Josef Korbel School of International Studies. He is particularly interested in quantitative research methods, the potential impacts of information communication technology on state stability, and the use of internet search data for foreign policy analysis.



**Yutang Xiong**, the Center's Lead Data Operations Manager, is pursuing a PhD in Research Methods and Statistics at the University's Morgridge College of Education. Yutang has completed his coursework and will soon begin his dissertation. He is especially interested in missing-data analysis and mixed-methods research and has recently been exploring growth curve modeling.



## A Salute to Three Pardee Center Innovators

We want to salute three special people who began their careers at the Pardee Center and contributed so much to its growth and development. Although each has now moved to the next stage in their respective career paths, their impacts on the daily life of the Center continue.



**Mickey Rafa** was the first of the three to join the Pardee Center, beginning as a Research Aide in 2011. After completing his MA in International Studies from the Korbel School in 2013, Mickey was hired in a staff role as Research Associate and Project Manager and he later became the Assistant Director for Research Operations. Mickey had a dual role at the Center, significantly contributing to our research capabilities and also developing the Center's financial tracking and reporting

systems and human resource policies and processes (he also completed a MS in Business Analytics in 2017). On the research front, Mickey led the effort to incorporate subnational modeling in IFs and he played a lead role in subnational projects in several countries. As part of that work, Mickey said that one of the things he most enjoyed was “working with the DU Geography Department to learn and implement ‘nightlights methods’ to estimate subnational GDP and poverty in Uganda.”



**Dave Bohl** joined the Center in May 2012, noting that he “was able to convince Barry and Jonathan to let me start before I was officially a student.” Dave moved to a staff role as a Research Associate in 2014 after completing his MA in the Korbel School's Global Finance, Trade, and Economic Integration program. In terms of research, he most valued his opportunities to collaborate on IFs development, specifically mentioning work with Barry on the informal economy model, with

Mohammad on representation of age/sex poverty, and with José, Barry, and Caleb on bilateral trade, as well as “spelunking adventures with Willem in various areas of the agriculture or economic models.” Dave was also a premier IFs trainer and especially enjoyed watching a room full of people with diverse perspectives “begin to understand how deeply connected their efforts really were (or could be).” As Dave moved into a more administratively demanding role (his title was Associate Director of Modeling and Analysis when he left the Center), he still much enjoyed being a sounding board and continuing to draw on his knowledge of model dynamics and features to troubleshoot model issues.



**Whitney Doran** left for the Peace Corps when she completed her MA in International Development at the Korbel School in 2013. After her return, she joined the Pardee Center in a staff role as the Diplometrics Project Manager in 2017. The Center's research portfolio was growing rapidly and one way to meet the increased workload was through quickly expanding the number of research aides (RAs). To make best use of this cadre of students, and also to assure they were having

an enriching experience, Whitney developed a model RA system. Dedicated teams of RAs were assigned to projects aligned with their skillsets and interests and RA Project Leads were hired to help manage the work of the teams, offer training, and provide general leadership. Whitney expanded the program to include trainings, professional development opportunities, and diverse leadership roles for RAs. She noted "I felt truly honored to work with students who were going so far above and beyond what might typically be asked of a student researcher." At the time she left the Center, Whitney's title was Assistant Director of Project Operations and the same care and sensitivity with which she developed the RA system was manifested in a large and diverse array of activities, including leading the production of the Annual Review for 2019–2020 and 2020–2021.

In closing, Mickey, Dave, and Whitney were also central to the Center's strategic planning process during 2019 and the first two years of its implementation. All three were leaders in their respective ways and we are fortunate individually and as a Center to have had them as colleagues and friends. We wish them great success in the next steps of their respective careers.

**Janet Dickson**



*We are grateful to Rhea Grover for gathering and preparing much of the information presented throughout this section and also in the following section on *The Pardee Center in the World*.*

*Rhea was a Research Aide who focused on communications-related projects for the Center. Rhea completed her MA at the Korbel School in June 2022 and we celebrate her many achievements and contributions.*



# THE PARDEE CENTER IN THE WORLD

Just as our research tools require “hands on” from a dedicated and diverse team of Pardee Center staff and students in order for the analytic work to occur, the resulting studies

require dissemination in order for our work to advance knowledge and to inform public policy strategies. We disseminate our research through participation in various kinds of public

events and through publications for both scientific and policy-oriented communities. In this section we provide information about such activities over the past year.





## Presentations, Conferences, Meetings, & Events

### OCTOBER 2021

- **Willem Verhagen** and **David Bohl** developed and delivered an **online UNDP workshop** to officially launch a project on how “**green growth**” might **accelerate development in Guinea-Bissau**. The workshop was hosted by UNDP Guinea-Bissau for key stakeholders from the country’s governmental and nongovernmental organizations.



### NOVEMBER 2021

- **Jonathan Moyer** and **Taylor Hanna** traveled to **New York** to launch the third report on the impact of war in Yemen. The report is titled ***Assessing the Impact of War in Yemen: Pathways for Recovery***. The event was hosted by UNDP and the Government of Sweden.
- **Jonathan Moyer** traveled to **Stockholm** to present findings and participate in a rollout event at the **UNDP Media Roundtable** for the third impact of war in Yemen report which was commissioned by UNDP Yemen.
- **Willem Verhagen** presented the findings of the report ***The Future of Food Security in the Wake of the COVID-19 Pandemic*** at an **online USAID Bureau for Resilience and Food Security** event that included a follow-up Q&A session. The presentation was organized by USAID’s Research Technical Assistance Center and included participants from USAID, the Pardee Center, and other research institutes.
- **Willem Verhagen** participated in the 14<sup>th</sup> IAMC annual meeting hosted **online** by the Integrated Assessment Modeling Consortium.

### DECEMBER 2021

- The Pardee Center and the Korbel School cohosted a rollout event for the **third impact of war in Yemen report** at the **University of Denver** with report findings presented by **Taylor Hanna**.
- **Taylor Hanna** **virtually** presented report findings from the **third impact of war in Yemen** report to a convention of Yemeni businesswomen organized by the UN Office of the Special Envoy of the Secretary-General of Yemen. The presentation focused on how female empowerment can strengthen recovery prospects.





## FEBRUARY 2022

- Earth scientist **Brian O’Neill**, previously Director of Research at the Pardee Center and one of the major contributors to the latest IPCC report, was featured on **NPR’s *All Things Considered*** to discuss the report.
- **Taylor Hanna** led a **virtual webinar** training session on the **International Futures model** for UN Country Teams and researchers in Central Asian countries in an event organized by UNDP.
- **The Pardee Center** hosted a series of presentations to U.S. House and Senate Foreign Relations Committee staff, the U.S. Institute of Peace, and USAID Yemen staff on findings from the **third impact of war in Yemen report**, which was commissioned by UNDP Yemen.
- **Willem Verhagen** explored potential implications for long-term food security in **Uganda** at a **USAID Country Development Cooperation Strategies “Next Level Learning Hours”** session sponsored by USAID Uganda. His presentation drew on the Pardee Center’s report titled *The Future of Food Security in the Wake of the COVID-19 Pandemic* which explored potential implications for long-term food security across the world.

## MARCH 2022

- **Taylor Hanna** traveled to **Brussels** and **Riyadh** to present findings and participate in rollout events for the **third impact of war in Yemen report**. UNDP hosted the event in Brussels and UNDP and the Saudi Development and Reconstruction Program for Yemen hosted the event in Riyadh.
- **Willem Verhagen** and **David Bohl** led a five-day training in **Bissau** for senior government officials, NGO personnel, and academic researchers on using the International Futures model for **analysis of developmental trajectories in Guinea-Bissau**.
- **Willem Verhagen** and **David Bohl** launched the report ***Exploring Alternative Futures of Development: Economic and Human Development Trends to 2040*** in Bissau during a UNDP-event with senior government officials, NGO personnel, academics, and UNDP representatives. The event was hosted by UNDP Guinea-Bissau.

## APRIL 2022

- **Taylor Hanna** led a second UNDP-organized **virtual webinar** training session on the **International Futures model** for UN Country Teams and researchers in Central Asian countries.





## MAY 2022

- **Jonathan Moyer** and **Collin Meisel** co-moderated an **online breakout session** on the **geopolitical implications of the war in Ukraine** for the Organisation for Economic Cooperation and Development's Development Assistance Committee Friends of Foresight Annual Meeting.

## JUNE 2022

- **Jonathan Moyer** and **Willem Verhagen** participated in-person in **Vienna** at the hybrid in-person/online 2022 **Scenarios Forum**, presenting papers on future geopolitics and food security and also co-chairing a panel on the analysis of gender equality and future challenges to climate change adaptation and mitigation. **Mohammad Irfan** participated virtually with a poster presentation on IFs model results related to gender and poverty and the IFs education model.
- **Jonathan Moyer** participated **virtually** in the launch of the **new website of the Institute for Security Studies' Africa Futures and Innovation Program**. The site is focused on the long-term future of Africa and includes data and forecasts from IFs on the long-term development prospects of each African country, region, and income group.
- **Taylor Hanna** traveled to **Almaty, Kazakhstan** to present ongoing work on the future of pandemic recovery pathways in Central Asia at the **Second Regional SDG Summit** jointly sponsored by UNDP, the European Union, the Government of Kazakhstan, and the Asian Development Bank.

## JULY 2022

- Pardee researchers **Jonathan Moyer, Collin Meisel**, and **Caleb Petry** partnered with **Mathew Burrows** of the Atlantic Council to host a scenarios workshop with subject matter experts in Washington, D.C. to present **newly created forecasts of geopolitical influence**. The forecasts, created with the International Futures model, built on a recent Pardee Center/Atlantic Council joint report.
- **Taylor Hanna** and **Stellah Kwasi** led a three-day workshop co-hosted by the Economic Policy Research Centre (EPRC) at **Makerere University in Kampala, Uganda**. The workshop focused on **training participants in the use of the International Futures model** with an emphasis on forecasts and scenarios for Uganda. The trip also included the public launch and presentation of work that Pardee Center researchers have done with EPRC exploring development trends at subnational levels in Uganda.

PRESENTING  
PAPERS ON  
FUTURE  
GEOPOLITICS  
AND FOOD  
SECURITY  
AND ALSO  
CO-CHAIRING  
A PANEL ON  
THE ANALYSIS  
OF GENDER  
EQUALITY

# Publications

## JOURNAL ARTICLES

### What Are the Drivers of Diplomacy? Introducing and Testing New Annual Dyadic Data Measuring Diplomatic Exchange

By: Jonathan D. Moyer, Sara D. Turner, and Collin J. Meisel

Journal of Peace Research, November 2021

*This article, first published as a Research Note in 2020, introduces and evaluates the dyadic dataset developed by the Pardee Center's Diplometrics program to measure formal diplomatic relationships.*

### To Purge or Not to Purge? An Individual-level Quantitative Analysis of Elite Purges in Dictatorships

By: Edward Goldring and Austin S. Matthews

British Journal of Political Science, December 2021

*Why do dictators purge specific elites? And why do dictators purge these elites in certain ways? This journal article examines these questions to understand how dictators retain sufficient competence in their regimes to alleviate popular and foreign threats and how they nullify elite threats.*

### The Future of Artificial Intelligence

By: Andrew C. Scott, José Solórzano, Jonathan D. Moyer, and Barry B. Hughes

International Journal of Artificial Intelligence and Machine Learning, January 2022

*This article focuses on the conceptualization of artificial intelligence (AI) and provides initial forecasts of narrow, general, and super AI through the end of the century.*

### Don't Turn Around, Der Kommissar's in Town: Political Officers and Coups d'état in Authoritarian Regimes

By: Austin S. Matthews

Journal of Peace Research, May 2022

*This article explores the development and use of strategic institutional design within dictatorships and argues their particular effectiveness in preventing coup attempts.*

### Measuring and Forecasting the Rise of China: Reality over Image

By: Jonathan D. Moyer, Collin J. Meisel, and Austin S. Matthews

Journal of Contemporary China, May 2022

*This journal article presents a new multidimensional measure of relative national capabilities and forecasts using the International Futures model across 29 alternative scenarios. In 26 of the scenarios it forecasts that Chinese capabilities will surpass those of the U.S. before 2060.*

### Identifying Patterns in the Structural Drivers of Intrastate Conflict

By: Jonathan D. Moyer, Austin S. Matthews, Mickey Rafa, and Yutang Xiong

British Journal of Political Science, July 2022

*This article describes the use of quantitative methods to better predict civil conflict onset and*

*to understand causal mechanisms that lead to conflict in order to inform policy interventions and conflict theory.*

### How Many People is the COVID-19 Pandemic Pushing into Poverty? A Long-term Forecast to 2050 with Alternative Scenarios

By: Jonathan D. Moyer, Willem Verhagen, Brendan Mapes, David K. Bohl, Yutang Xiong, Vivian Yang, Kaylin McNeil, José Solórzano, Mohammod Irfan, Cade Carter, and Barry B. Hughes

Plos One, July 2022

*In this article, the International Futures modeling system is used to analyze the long-term effects of COVID-19 on poverty at the country level across various income thresholds. Eight scenarios explore differing assumptions about the effects of the pandemic on economic growth and inequality compared to a world without COVID.*

## REPORTS

### Pursuing the Sustainable Development Goals in a World Reshaped by COVID-19

By: Barry B. Hughes, Taylor Hanna, Kaylin McNeil, David K. Bohl, and Jonathan D. Moyer

UNDP, August 2021

*This report, which served as the foundation for a UNDP Flagship Report, forecasts potential progress toward several SDGs under three sets of circumstances: what might have occurred in a world without COVID; in a COVID world as experienced at that time; and in a world where the pandemic became even more damaging*



than anticipated. The report then explores the potential for accelerating our progress through and beyond 2030 in the COVID world (middle scenario).

### **China's Influence Capacity in Ukraine**

By: Collin J. Meisel

USAID Ukraine, October 2021

*This policy brief examines trade, aid, arms, investment, and diplomatic engagement patterns in Ukraine and their implications for USAID's mission.*

### **Assessing the Impact of War in Yemen: Pathways for Recovery**

By: Taylor Hanna, David K. Bohl, and Jonathan D. Moyer

UNDP Yemen, November 2021

*The third in a trilogy of reports produced in collaboration with UNDP Yemen, this report uses the International Futures model to explore the effects of the ongoing war in Yemen as well as pathways for a successful recovery.*

### **The Future of Food Security in the Wake of the COVID-19 Pandemic**

By: Willem Verhagen, David K. Bohl, Mallory Cannon, Andres Pulido, Audrey Pirzadeh, Iris Nott, and Jonathan D. Moyer

USAID Research Technical Assistance Center, November 2021

*This report uses the International Futures model to assess how the COVID-19 pandemic may affect food security for the next two decades*

*by mapping potential effects of the pandemic in 185 countries to the year 2040.*

### **Summary of Findings—The Future of Food Security in the Wake of COVID-19**

By: Willem Verhagen

USAID Research Technical Assistance Center, February 2022

*This summary of findings covers the main results of the Future of Food Security report which uses the International Futures model to understand COVID-19's impact on food security (see immediately preceding publication listed above).*

### **Advancing Development in Uganda: Evaluating Policy Choices for 2016–21 and Selected Impacts to 2040**

By: Jonathan D. Moyer, Alex Porter, Shelby Johnson, Jason R. Moyer, and David K. Bohl

USAID, March 2022

*This report uses the International Futures model to explore policy interventions in Uganda from 2016–21 and their broad implications to 2040 (the time horizon for Uganda's current National Development Plan).*

### **Advancing Development in Uganda: Evaluating Policy Choices and Their Long-term Impact**

By: Mickey Rafa, Abigail Kabandula, David K. Bohl, Vivian Yang, Stellan Kwasi, Taylor Hanna, and Jonathan D. Moyer

SSRN, March 2022

*Motivated by the desire to better understand the future of development in Uganda, this report*

*uses the International Futures model to explore Uganda's development trajectory under varying policy strategies at three points in time (2030, 2040, and 2050).*

### **Exploring Alternative Futures of Development: Economic and Human Development Trends to 2040**

By: Willem Verhagen, Caio C. Pereira, David K. Bohl, Mark E. Meziere, Mohammad T. Irfan, and Jonathan D. Moyer.

UNDP Guinea-Bissau, March 2022

*This report examines the economic and human development outlook in Guinea-Bissau to 2040. It finds that economic growth will improve the human condition but also that progress will remain stunted unless there is broader development progress in education, governance, and infrastructure.*

### **Potential Long-term Effects of COVID-19 on Economic and Human Development in Uganda**

By: Taylor Hanna, Deva Sahadevan, Francis Mwesigye, Paul Lakuma, and Linda Nakato

EPRC, March 2022

*This policy note produced in collaboration with the Economic Policy Research Centre in Kampala explores the effect that the COVID-19 pandemic has had in Uganda and possibilities for accelerating recovery and progress.*

### **Undernourishment Brief: The Future of Food Security in the Wake of the COVID-19 Pandemic**

By: Willem Verhagen

USAID Research Technical Assistance Center, May 2022

*This brief uses the International Futures model to better understand consequences of COVID-19 on food security around the world over the next two decades.*

### **Undernourishment Brief: Unpacking the Impacts of COVID-19 on Long-term Food Security**

By: Willem Verhagen

USAID Research Technical Assistance Center, May 2022

*This brief looks at three scenarios for food security by 2040 and quantifies the impact of COVID-19 on undernourishment by 2040. It then unpacks the underlying drivers of food supply, food access, and food utilization.*

### **Child Stunting Brief: The Impact of COVID-19 on the Reduction of Child Stunting Over the Next Two Decades**

By: Willem Verhagen

USAID Research Technical Assistance Center, May 2022

*This policy brief introduces three scenarios on COVID-19 impacts on child stunting today and toward 2040. It then quantifies these long-term impacts for the world and for individual regions and provides strategic directions for policy.*

### **Scenario Surveillance Analysis: One Year On**

By: Collin J. Meisel, David K. Bohl, Jonathan D. Moyer, and Mark Meziere

USAID, March 2022

*This report assesses Ukraine's projected development prior to Russia's full-scale invasion and relative to the prior year's forecast. It also explores qualitative scenarios and development implications of further Russian aggression against Ukraine.*

### **Potential Effects of the COVID-19 Lockdowns on Long-term Educational Attainment in Uganda**

By: Stellah Kwasi, Mohammod T. Irfan, Taylor Hanna, Linda Nakato, and Paul Lakuma

EPRC, July 2022

*This Economic Policy Research Center (EPRC) Policy Note uses the International Futures system to explore the potential impacts of learning disruptions caused by COVID-19 on educational outcomes and long-term productivity in the 15 subregions of Uganda up to 2050.*

## **BOOKS AND BOOK CHAPTERS**

### **The Sustainable Development Goals: Past, Present, and Future**

By: Taylor Hanna, Jonathan D. Moyer, and Wondemneh Pawlose

Chapter in The Europa Directory of International Organizations 2022 (24<sup>th</sup> edition), Routledge, July 2022

*This review describes how the Sustainable Development Goals emerged from the earlier*

*Millennium Development Goals, assesses opportunities for their achievement, and suggests next steps needed for global development planning.*

## **NEWSPAPERS AND BLOG POSTS**

### **Every Day of Continued Conflict in Yemen Costs 80 Lives**

By: Taylor Hanna, David K. Bohl, and Jonathan D. Moyer

The Hill, December 2021

*In this op-ed, authors of the third impact of war in Yemen report review its findings and implications for pursuing post-conflict recovery in the country.*

### **A New U.S. Foreign Policy Mantra: "Don't Just Do Something, Stand There"**

By: Collin J. Meisel

The Hill, January 2022

*In this piece, Collin Meisel writes about the urge for action in response to conflict.*

### **How Good Governance Can Progress Uganda's Sustainable Development Goals**

By: Stellah Kwasi

London School of Economics (LSE), May 2022

*In this blogpost, Stellah Kwasi discusses Uganda's governance trajectory and the Pardee Center and USAID report on Ugandan development policy choices and the country's National Development Plan.*

**It's the End of the World as We Know It, and I Feel Fine**

By: Collin J. Meisel

The Hill, May 2022

*Collin Meisel discusses recent Pardee Center research on a potential U.S.-China power transition and its implications for policymakers and their constituents.*

**The Pivotal Role of Small and Middle Powers in Conflict: Poland and the War in Ukraine**

By: Collin Meisel and Tim Sweijs

U.S. Army Training and Doctrine Command  
Mad Scientist Laboratory, May 2022

*In this piece, the authors use the case of Poland's support for Ukraine to illustrate the current and likely future pivotal role of small and middle powers despite a return to "great power politics."*

**THIRD PARTY PUBLICATIONS****Egypt's 2021 Voluntary National Review**

By: Ministry of Planning and Economic  
Development

UNDP, July 2021

*Using the International Futures model, the Pardee Center provided forecasts and scenarios which are heavily featured in Egypt's 2021 Voluntary National Review.*

**Leaving No One Behind: Impact of COVID-19 on the Sustainable Development Goals (SDGs)**

By: UNDP Flagship Publication, August 2021

*This report grew out of a UNDP/Pardee Center partnership that explored the impact of COVID-19 on the SDGs and potential pathways for accelerating progress toward the SDGs even in the face of the pandemic.*

**Dr. Willem Verhagen and The Future of Food Security in the Wake of COVID-19**

By: Nigel Gibbs

USAID Research Technical Assistance  
Center Blog, November 2021

*Pardee Center researcher Willem Verhagen features in this article that discusses the research and findings presented in the Pardee Center report titled *The Future of Food Security in the Wake of the COVID-19 Pandemic*.*

**Foresight Africa 2022**

By: Brookings Institution

January 2021

The report uses diplomatic exchange data from the Pardee Center's Diplometrics project.

**Food, Fibre, and Other Ecosystem Products. Chapter 5 in: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Sixth Assessment Report of the Intergovernmental Panel on Climate Change**

By: Rachel Bezner Kerr, Toshihiro Hasegawa,  
and Rodel Lasco (Coordinating Lead Authors)

IPCC, April 2022

*Pardee Center researcher Willem Verhagen and students contributed to the latest IPCC report by providing an expert review in draft stages of this chapter.*

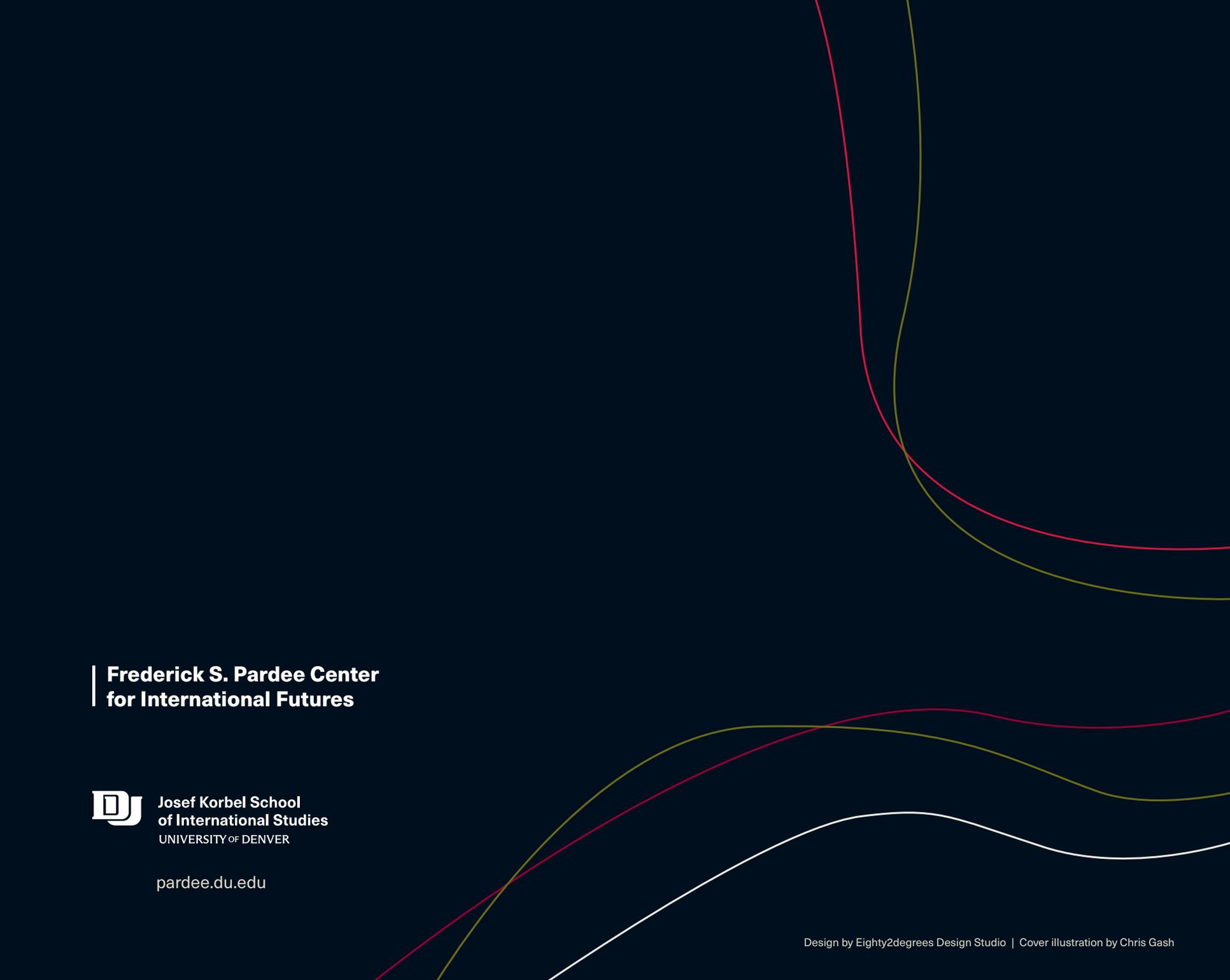
**Poverty, Livelihoods, and Sustainable Development. Chapter 8 in: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Sixth Assessment Report of the Intergovernmental Panel on Climate Change**

By: Joern Birkmann, Emma Liwenga, and Rajiv  
Pandey, Coordinating Lead Authors

IPCC, April 2022

*Pardee Center researcher Willem Verhagen and students contributed to the latest IPCC report by providing an expert review in draft stages of this chapter.*

“ WE HOPE THE  
VARIOUS ARTICLES  
IN THIS REPORT  
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for International Futures**

 **Josef Korbel School  
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