



NEWSLETTER

Public Engagement



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EDITORIAL

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This issue of the ARRIGE Newsletter is devoted to the topic of Public Engagement, notably in the realm of human genome editing. Ever since the announcement by He Jiankui in 2018 at the Second Human Genome Editing Summit (Hong Kong) of the birth of Lulu and Nana (from embryos he had genetically modified: [28 Nov 2018 - He Jiankui presentation and Q&A - YouTube](#)), the theme of public engagement is on everyone’s minds. Each and every national and international statement released on the topic of human genome editing (as well as plant and animal genome editing) places as a priority that of engaging more deeply with the public at large so as to shift the center of discussion from scientists and experts to lay people.

At each released report or international conference, the necessity for the public to engage and participate in the discussion on the ethics of human genome editing is iterated and reiterated. A plethora of publications, books and articles, focus on public engagement: the why, the how, the impact. Indeed, there is no lack of the written or spoken word on the topic, which has led many to believe that only lip service is being paid to what is considered as a crucial element of editing the human genome. It has become thus commonplace to assert that no one has put “their money where their mouth is”, and in fact carried out real tangible public engagement initiatives. Nothing

can be farther from the truth. This Newsletter 6 will document several important public/citizen engagement programs and provide out readers with both the approach and methodology used. Though it is important to underline that methodologies differ from one initiative to another, it is even more important to highlight that

these endeavors exist and can serve as templates for future similar projects.

We will start by presenting an initiative that is soon to be completed and that three ARRIGE members partook in actively (Hervé Chneiweiss, François Hirsch and yours truly): The Global Citizens' Assembly on Human Genome Editing. As you will see, several countries from around the world participated in this project and have produced results that will in turn be presented at an international gathering. In addition to the GCA's initiative, we also present two separate programs launched in South Africa, one that our ARRIGE member Dr. Sheetal Soni was involved in, and the other that our ARRIGE member Dr. Bonginkosi Shozi is in the process of completing. Last but not least, you will find access to UNESCO's public engagement forum that was held in January 2021. All texts below were written by the initiatives' coordinators. Some projects were generously funded, others managed to complete the project with very little subsidies. All contain pertinent and applicable ideas for future endeavors.

The first project presented – the GCA – is the largest and most international one of all. It emerged from The Centre for Deliberative Democracy and Global Governance at the University of Canberra following the Second Summit on Human Genome Editing held in Hong Kong (2015). The aim of the GCA is to develop a concrete response to the urgent ethical and regulatory questions in relation to genome-editing technologies based on citizen input.

Thusfar, the Global Citizens' Assembly has brought together twenty participants representing different countries across all continents. Participants involved have taken part in five-or-more days of deliberations focusing on both individual and global principles of human genome editing governance. All participants heard from scientists at the forefront of genomic research, ethicists, as well as other stakeholders. The GCA's ultimate objective is to have the ear of decision-makers at both national and global levels.

Recommendations based on national citizen assemblies that were held will be presented at the Global Citizens' Assembly (tentative date and place, The Hague in 2023). These recommendations will then be reported to the Secretary General of the United Nations, the Director-Generals of the World Health Organization, the Food and Agriculture Organization, relevant Ministers and government departments throughout the world, as well as to relevant stakeholders from industry and scientific research & development sectors.

ARTICLES

GLOBAL CITIZEN ASSEMBLY INITIATIVE (<https://www.globalca.org/>)

Country Reports

1. The Australian Citizens' Jury on Genome Editing.

Principal Coordinators: Dianne Nicol and Simon Niemeyer.

This research is supported by grants from the Australian Research Council and Medical Research Future Fund.

Scientists can now edit genes with relative ease and precision. Although there is much we still do not know, genome editing offers new possibilities for improving human and ecological wellbeing. At the same time, it poses risks and ethical challenges. We believe that ordinary citizens, not just professional ethicists and scientists, can deliberate effectively on these complex matters. This is why we convened a national citizens' jury on genome editing that will feed into a global conversation on the issue.

The Event. From June 17th to 20th 2021, twenty-three ordinary Australians selected from all over the country came to Canberra to deliberate on this question: Under what conditions or circumstances might the application of human genome editing technology be acceptable?

Participants had access to some of the country [leading experts](#) and genome editing. They were given time to reflect on their views and engage in a series of large and small group deliberations with the help of trained

facilitators. The citizens' jury concluded with a 'turnover ceremony' where their recommendations were conveyed to the country's most important decision-makers in the fields of science, health, and regulation.

Overall, the citizens' jury was designed to contribute to shaping the public conversation and policymaking about genome editing technologies and around the world.

This event was co-organized by the [Centre for Law and Genetics](#) at the University of Tasmania in collaboration with the [Centre for Deliberative Democracy and Global Governance](#) at the University of Canberra funded by the Federal Government's Medical Research Future Fund Genomics Health Futures Mission.

The main purpose of the Australian Citizens' Jury on Genome Editing is to engage the Australian community to better understand the conditions under which they might accept the application of various forms of human genome editing.

The outcomes of the citizens' jury were recorded in an interim report on genome editing. This report has been provided to relevant government and other bodies, and made publicly available, [here](#).

Core question. Under what conditions (or circumstances) might the application of human genome editing technology be acceptable?

Citizens' jury. The 23 participants were selected for demographic *and* discursive representation. Interviews were conducted using discourse methodology – where participants rank and sort a series of statements.

Outcomes

a. *Broadly (but not universally) shared positions on human genome editing generally*

If permitted:

- The primary aim should be to alleviate human suffering, improve quality of life and reduce childhood mortality.
- Adequate research is needed to identify and assess the potential risks and benefits, both to the individual and society.
- Meaningful consent and equity of access should be the overarching ethical principles.
- Both research and clinical application should be subject to appropriate regulation and approval processes including stakeholder and community education and input, peer review.
- Key terms should be defined to lessen the possibility of miscommunication or misuse of genome editing technologies.
- These recommendations should be revisited as the technology advances, and we know more about risks and benefits.

b. *More diverse views on heritable human genome editing and embryo research: majority view*

- Some support for future application of HHGE – but recognize need for more research
- Limited to where it might assist people to have healthy, genetically related children
- Diverse opinions about what constitutes appropriate regulation and acceptable levels of risk – majority favor strict approach
- Embryo research – should preference alternatives but, if no other options, the creation of human embryos through fertilization for research should be permitted - subject to stringent regulation and oversight, including 14-day rule

Underlying positions from pre and post deliberation discourse analysis

Position A: Beneficial Scientific Progress – enthusiasm about the potential medical benefits from the science of human genome editing, and relative unconcern about the potential negative social and ethical implications of human genome editing, including enhancement;

Position B: Social Benefits/Precautionary Risks – strong concerns for the potential social benefits and risks of human genome editing, especially if it is not motivated by the pursuit of the public good;

Position C: Principled Constraints – explicit normative or cultural opposition to human genome editing and its intended applications;

Position D: Revolutionary Medicine – a focus on the positive potential of human genome editing as a medical

technology, but concern about possible non-medical applications;

Position E: *Profound Social Risks* – strong concerns that genome editing will change society for the worse and that the pursuit of perfect people and societies will lead to a dystopian future;

Position F: *Libertarian Revolutionary Medicine* – relatively high-risk tolerance for genome editing research and clinical applications, and support for individuals' and parents' right to choose genome editing treatments.

Policy implications – from workshops with 40+ experts

- a. ***What does equity look like in action?***
Not just access – health equity more generally, whole of life
- b. ***How should concerns about commercialization be addressed?***
Focus on transparency and public good
- c. ***Is there a bright line between therapeutic and non-therapeutic genome editing?***
No, but need to prevent unethical practice
- d. ***What are the regulatory implications of the differing views on the status of the human embryo?***
Need a socially and ethically robust model
- e. ***How do we prepare for a future where heritable genome editing might be possible?***
Need to consider practical, legal and social dimensions
- f. ***How can meaningful public participation in genome editing policy development and governance be assured into the future?***
Requires inclusion and connectedness to decision making

Lessons from Australian Citizens' Jury on Genome Editing. There was an extraordinary ability of members of the public to engage with complex technology, complex ethics, complex law. We should not expect consensus.

We observed: common values; majority recommendations; diversity in underlying positions. This illustrates the importance of inclusive and rigorous debate about the risks and benefits of this complex and ethically fraught, but potentially transformative, scientific tool.

In responding to technological developments, a citizens' jury is not an end point in itself – but a valuable step in the development of trustworthy governance.

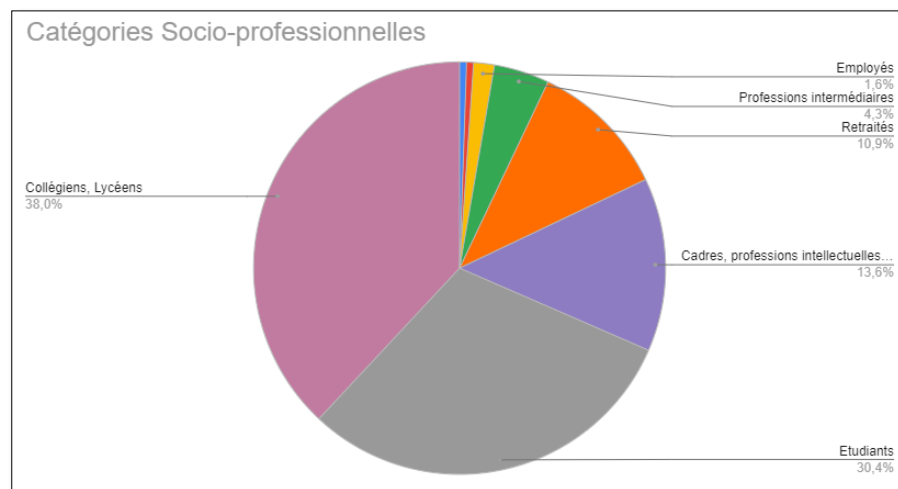
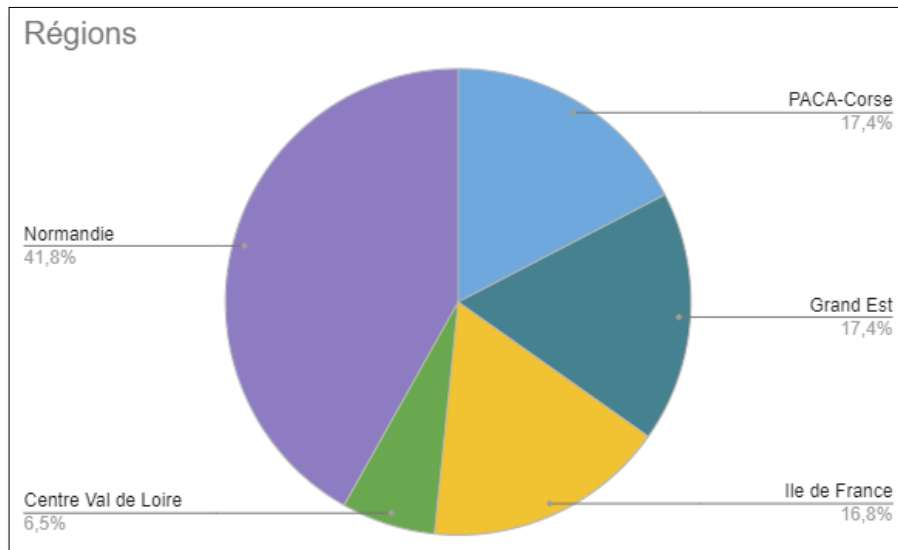
2. France: Citizen Deliberations in France on Genomic Engineering, 2021-2022

Principal Coordinator: H  l  ne Gebel, CNERER.

Three ARRIGE Members, Herv   Cheniweiss, Fran  ois Hirsch and Jennifer Merchant were also active in this project. Funding was provided by France's Regional Ethics Committees and the Inserm.

French citizen deliberation meetings were set up within the framework of the GCA project and is coordinated by the CNERER. This association, in existence since 2020, brings together all French regional ethical committees and collaborates with the Ministry of Health and the National Consultative Ethics Committee.

Five preparatory meetings among these regional committees from May to September 2021 allowed for the establishment of a common framework and the drafting of bibliographic resources as well as a Citizens' Charter. Citizen deliberation meetings were organized beginning at the end of September 2021 in 6 regions - Bretagne, Centre Val de Loire, Ile de France, Grand Est, Normandy, PACA -and assembled 184 citizens, mostly young people.



Regarding the methodology employed, all regions operated on the basis of 3 to 6 sessions, with small groups and designated persons who took on the role of facilitators. The exchanges were open-ended (no framework, no direct questions or pre-established themes). On the other hand, not all regions invited genomics experts, and final presentations were written either by the citizens themselves or by the members of the Regional Ethics Committees.

On the deliberations themselves, the following major trends emerged:

- International regulation as well as national laws are needed to establish principles and a framework that apply to everyone (the State, researchers, health professionals, private companies and citizens).
- Biological diversity must be protected; genomic engineering must not lead to a reduction in the number of living species nor to the standardization of physical characteristics.
- For humans, genomic engineering can only be used for curative purposes, under conditions that respect consent and promote equal access to treatment.
- Modifications of human germ cells must be prohibited.
- Genomic engineering can be used for animal and plant species if it reduces famine, malnutrition or the use of pesticides, all the while avoiding animal suffering.
- Education, information and public debate programs should be set up on genomic engineering.

Conference presenting the results: <https://www.ethique-hdf.fr/detail-evenement/restitution-nationale-des-jurys-citoyens-quels-sont-les-enjeux-ethiques-de-ingenierie-genomique/>

3. The United States.

Principal Coordinators: Kimberly Quach, Consortium for Science, Policy, & Outcomes, Arizona State & Mahmud Farooque.

The US Project funded by the National Institutes of Health and additional support from Kettering Foundation.

What does the American public think about editing our DNA? Should we cure diseases like sickle cell anemia? Enhance our own strength or intelligence? Design babies with our preferred hair and eye color? Genome editing, a practice that allows scientists to edit an organism's DNA, is rapidly advancing and could someday make these scenarios possible. The technology has great potential, but there are many questions about ethics, morality, risk, and equality that the scientific community cannot answer without public input.

Arizona State University, Baylor College of Medicine and the Museum of Science, with funding from the National Institutes of Health and additional support from Kettering Foundation, worked with genome editing experts and stakeholders to create a series of informed national citizen deliberations around the ethics and governance of genome editing. These deliberations with diverse members of the public were held in Boston, MA; Phoenix, AZ; Waco, TX; and virtually with participants across the U.S. in Fall 2021. The results offer early insight into the public values around the future opportunities and challenges with these technologies.

Preliminary results revealed that deliberation participants' attitudes were positive about HGE applications for disease prevention, treatment, and cure. In fact, when considering the technology overall, participants' hopes for its benefits focused on its potential as a medical treatment for disease. However, cosmetic and performance enhancement applications were viewed negatively, and participants opinions became even more critical of these applications after the deliberation. When asked who should fund HGE research, the only organization that participants responded to strongly in the negative was the Department of Defense. This is another signal of participant concerns with potential enhancement uses or weaponization, fearing super humans and increased global inequality.

A common divide in the expert literature about HGE is the issue of heritable (germline) vs. inheritable (somatic) editing. Participants were not concerned with this divide. They rarely mentioned somatic editing and focused primarily on germline editing which raised numerous concerns such as the future person's autonomy, safety, unintended consequences, and irreversibility. These concerns were similar to their concerns for the technology overall. Taken together, participants were optimistic about the potential of HGE as a medical treatment, but wary of its societal level impacts such as increasing inequality or causing unintended, irreversible side effects.

There was strong agreement (85.5% of participants) that HGE research should be allowed to proceed, but it requires regulation and that the public should be allowed to participate in decision-making. One of the biggest concerns is the potential of HGE to exacerbate societal inequalities. Participants believed HGE should be practiced by unbiased experts with clinical knowledge, accreditation, moral qualifications and government regulation and institutional oversight. Transparency, equity, and justice were among the most important principles to consider when making decisions about HGE research.

These results can help shift the conversation around HGE from reactionary to anticipatory and ensure that future governance of HGE considers the needs and values of the public before and not after technological momentum takes over. In the final stages, the project team is working with expert consultants to develop a series of manuscripts that map the major governance milestones in human gene editing, examine the governance challenges in the next 10 years, and recommend how best to govern the plausible directions of the technology integrating the outcomes of the public forums.

4. United Kingdom Citizens' Jury on Genome Editing.

Principal Coordinators : Anna Middleton, Simon Burall, Marit Hammond.

The UK Jury funded by the Society and Ethics Research Group from the Wellcome Genome Campus.

Scientists can now edit the code of life (the genome) with relative ease and precision. However, the idea

of permanently changing the human genome in future generations generates strong opinions. In the UK, as in most countries worldwide, it is illegal to perform genome editing on embryos that lead to pregnancy.

Whilst the editing process is not currently 100% accurate, scientists predict that it soon will be. This means that public audiences should be brought into the conversation now about the application of the technology so that policy makers can take account of societal perspectives when discussing the legislation. Being able to change the DNA of human embryos has been hailed as a game changer for potentially curing some hereditary genetic disorders from all future generations in a family. However, for cultural, religious, or ethical reasons, some feel the manipulation of human embryos is a step too far for society.

Families with a known genetic disorder already have the option to use genetic testing to try and have children who are unaffected by the disease. But these technologies don't work for everyone.

The Citizen's Jury. For a week in September 2022, 21 people with personal experience of genetic disease travelled from across the UK to the Wellcome Genome Campus near Cambridge to sit as members of the UK Citizens Jury on Genome Editing. The jury members were selected to broadly reflect the demographic make-up of patients who are eligible to use genomic medicine services and genetic counselling in the NHS.

A citizen's jury typically involves a period of intense learning from experts, focused deliberations, voting on an ethical question and the writing of policy recommendations – and that is exactly what they did here.

The aim was to provide an insight into the perspectives of a group of patients with inherited genetic conditions on what they think about the benefits, risks and wider harms emerging from the application of embryo genome editing. Their recommendations support policy makers, researchers and wider civil society to better understand informed public perspectives.

The jurors welcomed the opportunity to have their voices heard and felt that public engagement on genome editing shouldn't be left to chance. The technology is developing fast and the jurors believed that some groups would start lobbying for a change in the law in the not-too-distant future.

They asked for policy makers to be proactive in shaping the inevitable debate which will begin and ensure that all voices within society are heard as it develops. Many of the jurors were clear that they did not want to stop scientific advancement but rather wanted it to be done in a transparent way that took account of their lived experience of having or being affected by a serious genetic disease. Changing the DNA of human embryos was re-framed by some of the jurors as a form of 'treatment' for genetic disease (and thus this term is used in the report).

The citizens jury deliberated over 4 days on the following question:

Are there any circumstances under which a UK Government should consider changing the law to allow intentional genome editing of human embryos for serious genetic conditions?

When polled at the end of the process the majority of the jurors agreed (17 to 4) that the government should consider changing the law to allow intentional genome editing of human embryos for serious genetic conditions, and most felt that these discussions should be beginning now.

The views that informed this conclusion were nuanced and complex and, whilst the majority expressed broad support for the clinical application of the technology, there were limitations and conditions

attached to this. A minority also felt extremely concerned about the structural inequalities for disabled people that currently exist and thus could not contemplate supporting embryo editing at the present time.

COMMENTS FROM JURORS AT THE END OF THE PROCESS

The jury has been a rollercoaster emotionally and mentally. It has been amazing to hear the personal stories of the others on the jury. I won't call myself a 'juror' but a member of the UK jury family.

There are not many positives about living with a rare disease, but the experience of the Citizens Jury has certainly been one of them. I am grateful to have had this unique opportunity to have my say on one of society's most complex and significant issues.

Other UK references

Wellcome Connecting Science partnered with Involve and Genetic Alliance UK to run the UK Citizens' Jury on Human Embryo Editing. For full preliminary report, please visit: <https://cspo.org/wp-content/uploads/2022/10/PGET-Report-100622.pdf>

20-minute documentary on the Citizens' Jury

[View the 3 minute trailer and 10 minute versions of the documentary here](#) Wellcome Connecting Science partnered with Involve and Genetic Alliance UK to run the UK Citizens' Jury on Human Embryo Editing: <https://societyandethicsresearch.wellcomeconnectingscience.org/project/uk-citizens-jury-on-genome-editing/>

OTHER INITIATIVES NOT LINKED TO THE GCA SOUTH AFRICA

1. The Consensus Studies of the Academy of Sciences of South Africa.

Sheetal Soni, Board Member of ARRIGE, Senior Lecturer, University of KwaZulu-Natal, South Africa.

South Africa has one of the most genetically diverse populations in the world, which, combined with its high disease burden and high-quality infrastructure, makes it a prime location for conducting genetics and genomics research. South African genomes are therefore highly sought after by the global research community, and there is therefore opportunities and challenges for genomics and genetics. There is also lack of specific policy, legislation, regulations or guidelines in these fields. In 2016, the Academy of Science of South Africa (ASSAf) undertook to conduct a consensus study on the ethical, legal and social implications (ELSI) of genetics and genomics work, as they relate to research, health service provision and forensic applications in South Africa. The report focused on gene therapies, and while it did not focus on gene editing, it did make direct and indirect reference to it. The purpose of this study was to provide a document based on a combination of international best practices adapted to local conditions and deliberations by the panel, which could be used to assist to draft legislation, regulations and guidelines on matters relating to human genetics and the human genome. The resulting report was divided into three thematic areas significant for the ELSI of genetics and genomics work: (1) building relationships, (2) respect for persons and (3) good stewardship.

Building Relationships

This focused on engagement between human genetics and genomics practitioners and the general public and communities, and recommended that close attention is given to stakeholder engagement to promote understanding amongst all role players about their roles and responsibilities. The report suggested areas for engagement including academic research projects and genetic testing in the public and private sectors. The report emphasized the South African experiences with community engagement for genomics and the importance of education and translation of science into policy and practice, and the importance of ensuring that the public is well informed about participating in research projects.

Respect for Persons

This was based on the South African Constitution, which protects fundamental individual rights as well as cultural

and communal interests, including protecting the confidentiality of personal information and access to and control over such information. Autonomy refers to the right to make decisions concerning health and research participation, and in the context of clinical trials it is important that confidential personal information is protected. In gene therapy clinical trials, it is possible for genetic information to be used to identify a person, even if data are de-identified. The report recommended that the existing legal and ethical framework relating to the protection of personal information be revised to provide for a well-aligned and integrated framework that balances a range of diverse interests and the South African Protection of Personal Information Act (No. 4 of 2013) (POPI) could be used to do this, as it provides guidance on how to manage disclosure and sharing of personal information.

Good Stewardship

This final theme of the report was based on the characteristics of integrity, honesty, accountability and sharing that inform the notion of stewardship. Policies, legislation, regulations and guidelines must govern genetic and genomic testing; accreditation of laboratories; qualification and certification of staff; and mechanisms and circumstances for feedback of individual results, especially incidental findings. National frameworks for biobanks and access to samples and data are necessary to promote equitable and responsible sharing that will enhance knowledge generation and translational science while aligning with international policies and guidelines.

The Report used these themes to set out a set of recommendations to optimize use of resources in the country. All recommendations are intended to underpin dialogue and discussions leading to new policy, legislation, regulations and guidelines. It considers the ELSI of genetics and genomics in South Africa in the context of *ubuntu* philosophy, which loosely translates as ‘humanity’ and deepens respect for persons and infuses every sphere of South African life, including science. The panel recommended that the principle of *ubuntu* must be promoted in genetics and genomics research and also suggested that a South African Human Genetics Advisory Board be established, to provide guidance to policy makers and regulators.

In summary, the study emphasized the benefits to be derived from genetics and genomics work in research, clinical practice and forensic science, and the need for boundaries to be clearly defined and policies adhered to so that the benefits are shared by all while avoiding unnecessary harm. The practice of genetics and genomics should also serve the people of South Africa in the spirit of *ubuntu*. In 2020, ASSAf convened a second panel to undertake another consensus study and write a second report on gene therapies in South Africa. This report is currently in the editing process and will be released in 2023.

2. “A deliberative public engagement study on heritable human genome editing among South Africans: Study results”.

A group of researchers at the University of KwaZulu-Natal conducted Africa’s first-ever public engagement study on heritable human genome editing. This ground-breaking study made use of a deliberative engagement methodology, which led to a number of unique insights into how South Africans view key issues related to gene editing:

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0275372>

<https://doi.org/10.1371/journal.pone.0275372>

The implications of this study for the governance of heritable human genome editing are further explored by Dr Bonginkosi Shoji (ARRIGE Board Member) and Prof Donrich Thaldar in a manuscript to be published in the American Journal of Bioethics’ upcoming special issue titled: “Who Decides What is Equitable? Engaging with Public Preferences in Genomics and Precision Medicine”. Open peer commentary on this upcoming special issue is currently open, so interested parties may read the manuscript and submit commentaries on it here:

<https://mc.manuscriptcentral.com/uajb>

UNITED NATIONS/UNESCO : “Engaging the Public”, January 12th 2021

<https://www.youtube.com/watch?v=YwTNKLz2QdU>

ARRIGE COMMUNITY ANNOUNCEMENTS

ARRIGE has been invited to the 3rd International Summit on Human Genome Editing, which will take place at The Crick Institute, in London (UK) on 6-8 March 2023, organized by The Royal Society. ARRIGE will be represented by its President, Lluís Montoliu, and be part of a session entitled “Civil Society and Human Genome Editing” chaired by Françoise Baylis, in a round table on Roles and challenges in public engagement. This session has been scheduled on Wednesday 8 March 09:00-10:30. All sessions can be followed and viewed online through the ZOOM links provided by Organizers at the Summit web site:

<https://royalsociety.org/science-events-and-lectures/2023/03/2023-human-genome-editing-summit/>

ARRIGE’s next annual meeting will be held in person and online on **Monday 8 May 2023** at the National Centre for Biotechnology (CNB-CSIC), in **Madrid** (Spain). Please save this date. The focus of this meeting will be on plant GE in Europe.

The Third 3rd Albrecht Müller Seminar will be devoted to “Human Therapeutic Applications of Gene Editing”, The meeting will be organized in October - November 2023. Exact date will be announced in due course.

Publication: Jennifer Merchant & Ruth Horn, UK/France Gene Consortium, “Managing Expectations, Rights and Duties in Large-Scale Genomics Initiatives: A European Comparison”, *The European Journal of Human Genetics*, December 2022: <https://www.nature.com/articles/s41431-022-01247-y>

Publication: Alonso-Lerma B, Jabalera Y, Samperio S, Morin M, Fernandez A, Hille LT, Silverstein RA, Quesada-Ganuza A, Reifs A, Fernández-Peñalver S, Benitez Y, Soletto L, Gavira JA, Diaz A, Vranken W, Sanchez-Mejias A, Güell M, Mojica FJM, Kleinstiver BP, Moreno-Pelayo MA, Montoliu L, Perez-Jimenez R. Evolution of CRISPR-associated endonucleases as inferred from resurrected proteins. *Nature Microbiology* 2023 Jan;8(1):77-90. <https://www.nature.com/articles/s41564-022-01265-y>

Publication: Montoliu L. Historical DNA Manipulation Overview. *Methods Mol Biol.* 2022;2495:3-28. https://link.springer.com/protocol/10.1007/978-1-0716-2301-5_1



More information available at

<https://arrige.org>

You can register to ARRIGE

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