Interview Questions for Oceania Radiofrequency Scientific Advisory Association (ORSAA)

1. What was the purpose of your study?

It is important to clarify that ORSAA has not undertaken a single study but a large project aimed at collating and evaluating the available scientific evidence from the thousands of studies that have been performed all over the world for several decades. ORSAA's focus is on the effects of RF-EMF (which is mostly caused by the microwave radiation from wireless technologies).

The project began with an inability to reconcile what we knew from scientific research with what we were being told by Western radiation protection authorities i.e. that no conclusive evidence exists for harmful biological effects of low-intensity RF-EMF. However, we were aware of sound scientific papers that showed harmful effects.

Until now, most of the radiation protection authorities such as the WHO's International EMF Project, ARPANSA in Australia, and PHE in Britain take advice from a small NGO professional body, the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This is an industry–loyal group whose members are mostly experts in thermal physics, engineering and dosimetry. Very few members of the ICNIRP 'expert panel' have expertise regarding the biological effects of RF-EMF.

To address the narrow focus and the suspected bias, it was clear that the evidence needed to be: (i) compiled from all disciplines (e.g., biology, physiology, neurology, oncology, rather than just physics) and (ii) evaluated separately from industry influences.

As a group of concerned multidisciplinary scientists, we thus embarked on a mission to compile the vast scientific literature on this topic. We established an independent scientific organization (ORSAA) so that without bias, it would be possible to evaluate the evidence. ORSAA established a database of peer-reviewed scientific studies from all disciplines, beginning with findings from the early US and Russian military medical research (1950s to 1970s) and working through to more recent studies (which have benefited greatly from advances in molecular biology). We used the database capabilities to classify the bio-effects into major categories such as heart effects and leukemia. The result of this is described in a publication in an international journal Reviews on Environmental Health
(https://www.degruyter.com/view/j/reveh.2018.33.issue-3/reveh-2018-0017/reveh-2018-0017.xml)

2. What did your study find?

What we found was:

- **A compelling body of peer reviewed scientific evidence:**
  - A range of bio-effects with health implications; e.g., oxidative stress (now known to sit beneath other serious health conditions such as heart disease and auto-immune disease)
  - About three times more biological "Effect" papers than "No Effect" papers
- **Non-thermal effects**
  - Over 1500 non-thermal studies revealed health or biological effects.
- **Effects depend on the type of signal used**
  - When real mobile phones are used for *in vivo* (whole animal experiments) experiments, 7 times more "Effect" studies than "No Effect" studies are found
- **Effects below current safety limits:**
  - Bio-effects were occurring at much lower levels of exposure than what the current ICNIRP RF Guidelines permit;
  - Papers reveal mechanisms that operate at the cellular level and can drive these effects
- **Funding source appears to influence research outcomes:**
  - Nearly a third of the papers do not provide a statement clarifying funding source
  - Industry-funded studies (acknowledged) more often conclude "No Effect" while institutionally funded studies more often conclude "Effects".
  - There are a number of industry-funded researchers who consistently find "no effects". These are the very same scientists who are members of a number of influential international review panels and committees. This includes ICNIRP. Such panels regularly make statements that suggest to the public that there is nothing to worry about, contrary to what the scientific evidence is indicating.

3. What are the limitations of your study?

We have captured most of the available peer review RF-EMF research from 2000 onwards. However, there is a vast body of older studies, particularly those published in languages other than English, which is not included. For example, the Russians conducted most of the early research on RF biological effects and those studies are not in our database.

4. What are the implications of your study for humans?

Man-made RF-EMF, especially in pulsed-modulated form is highly bioactive, with serious health risks for humans.

The bio-effects that we are observing across the thousands of peer-reviewed studies in our database have wide-ranging health implications for humans, animals, insects, and plants. Understanding the links between the observed effects and follow on effects on the body, one can expect to see the following health issues becoming more prevalent in our society:

- Behavioural problems – irritability, sleep disruption, depression etc.
- Neurodevelopmental issues – ADHD, autism spectrum
- Fertility issues especially due to affected sperm
- Pregnancy complications and miscarriage
- More tumours/cancer (not just limited to brain tumours)
- Neurodegeneration leading to more Alzheimer's, dementia) – these are occurring at younger ages than generally expected,
- Cardiovascular problems
- Concentration difficulties and cognitive problems
- Neuro-muscular problems.

Claims that microwave radiation only causes health effects at thermal levels are unfounded. Thus the ICNIRP guidelines are in urgent need of update

The ORSAA database clearly demonstrates that current thinking by radiation protection authorities that only thermal levels have health implications, is out of date and in urgent need of redress. RF-EMF standards around the world need to provide biological protection that takes into consideration bio-effects that are occurring in the absence of heating. We should not be waiting for absolute proof of harm before acting. There is more than enough evidence of harm to act on. Best practice risk management philosophies would suggest **a precautionary approach should be adopted without delay.** Risks need to be clearly articulated in device operating instructions in order to raise consumer awareness. Government radiation protection agency fact sheets need to be upfront and honest about risks rather than dressing them up with uncertainty and misleading statements.

The goal is not to ditch technology; rather, it is to identify the risks and minimize them. That is, to advise the public about 'smart tech use'. Further, policymakers need to be made aware of the consequences of deploying radiofrequency transmitting infrastructure such as cell towers – how do we make them safer? Advice to industry is required in order to develop safer wireless technologies and to promote transparency on the risks associated with prolonged device use.

5. What would it be correct to conclude about health risks or hazards to humans from your work?

There are diverse health risks for users of mobile devices and those who are

exposed to RF from wireless infrastructure such as mobile masts. Altogether, the epidemiological studies and the well-conducted studies with no conflict of interest have found effects. A number of risks were even identified by the 13-country Interphone study, which was partially industry funded, and the French CERENAT study which followed the Interphone protocol.

The risk of brain tumours from mobile phone use is convincing.

In summary, research shows that for certain brain tumours:

- the higher the cumulative hours of mobile phone (MP) use, the higher the risk
- the longer the time from first using an MP, the higher the risk – 'If a mobile phone is used for more than 10 years there is a statistically significant risk"
- the higher the power, the higher the risk
- the younger you are, the higher the risk
- there is a higher risk of tumours occurring on the same side of the brain as the handedness of the user.

Hence, authorities need to be advising people to change their habits when using these radiation-emitting devices and to adopt a harm-minimizing approach.

Cancer risks
Currently RF-EMF is classified as a possible carcinogen (IARC Group 2B). Recent evidence suggests that RF-EMF is at least a probable carcinogen (IARC Group 2A) and evidence is building for it to be classified as a carcinogen (IARC Group 1). ORSAA has contributed to the recent round of submissions to IARC, with the aim of providing enough evidence to enable an IARC upgrade to a Group 1 classification.

Health effects are not limited to the increased risk of brain tumours. Effectively, every organ in the body is exposed to this exogenous man-made microwave radiation. See point 4 above.

6. What would it be wrong to conclude?

It is wrong to conclude that current RF Standards and guidelines provide safety for users of wireless device. It would also be wrong to conclude that using wireless devices that emit microwave radiation within prescribed safety standards are risk-free.

All of the risks are not fully understood, particularly for lifetime and heavy users. Just because we don't understand the mechanism, we cannot conclude that harm is not happening. The mechanisms for many human conditions have not been fully understood for decades (e.g. epilepsy), yet rather than denying the existence of such conditions, medical science has pursued understanding. The same scientific inquiry needs to be made regarding biological effects of RF-EMRs.
Otherwise humanity will be flying blind and learning decades later that we've failed to prevent a preventable human catastrophe.

7. What implications does your study have, if any for policy makers and regulators?

The radiation protection authorities that are pivotal in determining government and industry standards internationally, rely on the advice from ICNIRP.

For example, ICNIRRP was made a member of the World Health Organisation's IARC committee that evaluated the risk of cancer from RF-EMR. ICNIRP was a vocal participant in the IARC debate, during which they maintained their position (from early physics) that only heating effects of radiofrequency electromagnetic radiation (RF-EMR) are harmful, claiming that the rest of the science is not conclusive. In 2011 IARC declared that the science was limited for brain tumours and inadequate for other types of cancers. Thus IARC declared radiation from RF-EMRs to be a "possible" carcinogen.

Unfortunately, ICNIRP's weighty position does not give credence to the vast body of evidence from other disciplines such as biophysics, indicating that there are other serious, non-thermal biological effects of low-intensity RF-EMR.

One could ask, 'why such disregard of modern scientific evidence?' Perhaps the answer lies in conflicts of interest. Most of the present and past ICNIRP members have strong financial ties with the industry, even though ICNIRP claims to be an independent organisation. Furthermore, many of the members of the ICNIRP expert panel are not qualified to make judgments on biological harm. It seems that conflicts of interest are affecting the position of these influential bodies that dictate public exposure regulation. This is not the first time this has happened. We can look back in history and find similar behavior by industry manipulating government agencies using pseudo-science claiming 'no conclusive evidence', with classic examples being tobacco and asbestos. Unfortunately, due to such cover-ups of evidence, the public is not being informed of the consequences of RF-EMR exposures. In the long-term, this is likely to be detrimental to the health and wellbeing of populations across the world.

It has been suggested that ICNIRP acts like a private club that only includes membership for those who hold views favourable to the wireless industry.
https://www.orsaa.org/latest-news/is-icnirp-a-closed-club
In effect, ICNIRP is ignoring the evidence and holding onto outdated philosophies in an attempt to defend the indefensible.

There is therefore a need to overhaul the approach taken so far by the health authorities that are working with industry. Government regulatory agencies need to be financially independent of the industry. Expert review panels need to be truly independent to objectively and impartially review the scientific evidence and take protective action with consumer advice being upfront and not hidden in the fine print. Most of the regulating authorities have a conflict of interest because they are in the business of collecting money for the RF spectrum they sell. To roll out new wireless technologies and using new frequencies without proper safety testing and risking public health is both callous and irresponsible.

8. What further work needs to be done

Regarding the ORSAA database, we aim to improve the bio-effect classification process, so that the balance of evidence is more visible and transparent. We also will look at improved reporting functionality for the general public, creating fact sheets that identify risks and risk mitigation strategies.

From a research perspective, the scientific community needs to have more epidemiological and ecological studies funded, as well as proper clinical studies (run by clinicians using patients) that investigate a variety of health impacts (not just brain tumours). Studies should not just study impacts on humans but other species (honey bees, birds etc.) and also the wider environment.

ORSAA hopes that independent academic clinical researchers at hospitals and universities will use our database to collect the existing evidence of effects within their areas of interest. For example, immunologists could extract studies relevant to immune diseases and use the gathered data to tailor future studies. They could investigate the impact of RF-EMF exposure in their patient cohorts. For example, there are studies where patients with allergies were exposed to RF-EMF for a short period, and the before and after blood tests showed very clear differences; i.e. worsening of allergic responses. The information generated from such studies should be used to study larger patient groups, and to ask questions such as: can practical exposure minimization improve the condition of these patients?

Other research needs are to assess the impact of real-life RF-sources, typically found in most people's homes (Wi-Fi, cell phone, cordless phone, smart meters, Bluetooth game controllers, headsets and earpieces). There are differences between laboratory setups and real-life exposures. Exposure simulators commonly used in labs often are different from real life exposures.

Studies need to look at objective biomarkers such as blood chemistry changes, neoplasms, fertility and a host of other important endpoints.

Investigations are needed into electrohypersensitivity (EHS) - which currently only refers to overt neurological symptoms that people attribute to artificial EMF such as RF from wireless devices. There is emerging evidence suggesting that many mystery conditions of modern society, such as chronic fatigue syndrome, fibromyalgia could in fact be bona fide EHS. Such studies should be conducted by those who have medical qualifications, rather than psychologists as is mostly the case at present. The “nocebo” effect, or effects arising out of fear, is the explanation for EHS most often presented by psychologists (often funded by the industry). The explanation is refuted by clear scientific evidence of biological effects revealed in the ORSAA database reports. The studies on EHS using unreliable subjective measures need to be replaced with proper clinical studies using objective physiological tests.

Investigations need to assess the exposure from all sources, which has not happened in most epidemiological studies. Many studies have limitations on exposure estimation. Studies need to quantify exposure using the technologies available now, such as wearable exposimeters, and thereby conduct long term studies using accurate measures.

9. Is there a good related epidemiological study that you would recommend?

The studies conducted by the Hardell group in Sweden are better conducted with a more rigorous methodology for assessing the impact on brain tumours. For example, the Hardell group investigated the cordless phone use of brain tumour patients when other studies only took into consideration mobile phone use. Both types of phones expose people to similar levels of RF-EMF and people may spend more time on cordless phones, as they are cheaper than mobile phones. A good analogy is that of a doctor investigating the role of alcohol in a cirrhotic patient. It is not complete if only alcohol from whiskey drinking is taken into account, ignoring other alcoholic beverages.

10. What else should I look at/consider?

a. Electromagnetic hypersensitivity (EHS), a potentially disabling condition, is becoming more prevalent in our increasingly electrified environment. This is another area where finding an honest appraisal of the condition is extremely difficult. Vested interests are muddying the waters with industry-funded psychologists who are proposing it is caused by a nocebo effect. These findings are based on questionable provocation studies with flawed methodologies. Many people around the world are suffering unduly due to the misuse of science.

b. Study funding source predicts study outcomes

c. The inaccuracy of government managed cancer registries. For example, it has been demonstrated that the Swedish cancer registry is not entirely reliable due to missing cases.

d. How the criticality of RF for military function and government ICT strategies (including internet of things and surveillance) may be influencing the setting of levels being advised in RF Safety Standards.

e. How the public perception of harm is being deliberately misguided using internet blogs and opinions presented by trusted persons. For example, from the "Science-Based Medicine online report on *Are Cell Phones a Possible Carcinogen? An Update on the IARC Report* begins with a note from the editor apologizing that they are too busy to write a full report so that Lorne Trottier has instead written the article. https://sciencebasedmedicine.org/are-cell-phones-a-possible-carcinogen-an-update-on-the-iarc-report/ Lorne Trottier is an engineer, businessman and philanthropist who makes large donations to McGill University e.g. the Department of Electrical and Computer Engineering and the School of Computer Science.

f. The spin on EMR science and manipulation by industry at all levels as documented in Maisch, D. (2017) Spin in the Antipodes, Chap. 16 in Martin J. Walker (Ed.) *Corporate Ties That Bind: An Examination of Corporate Manipulation and Vested Interest in Public Health*. Skyhorse, 2017.

g. Online media services established to interpret and communicate the science to non-experts are being 'fed' information from scientists paid to promote the spin. Even worse, journalists who are being paid by the industry populate them.