

Opportunity Title: The Influence of Air Quality on Cognitive Performance and Behaviour in Secure Environment Fellowship

Opportunity Reference Code: ICPD-2024-48

Organization Office of the Director of National Intelligence (ODNI)

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How to Apply **Create and release your Profile on Zintellect** – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 3 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at:
<https://orise.orau.gov/icpostdoc/index.html>.

If you have questions, send an email to ICPostdoc@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline 2/28/2024 6:00:00 PM Eastern Time Zone

Description **Research Topic Description, including Problem Statement:**

The Foreign, Commonwealth & Development Office (FCDO) owns a complex global estate of buildings. Each building has its own unique qualities, and they are located in major cities where poor air quality is a factor. The buildings are designed in a way to maximize security and often overlook the human factors associated with their users and how these users interact with their workspace.

It is well documented (Lowe et al, 2018), that when human beings breathe in air with increased levels of Carbon Dioxide (CO₂), the CO₂ levels in our blood increases, meaning the blood is less oxygenated and this impacts how our brains function. In turn this can lead to poor memory, impaired concentration and reduces our decision-making capability. Current research has not examined the specific impact this may have upon analysts or individuals who work in security environments. Often the solution is not merely introducing air conditioning and other building information management systems to regulate these secure areas. We have not taken into account the impact of exposure to pollutants and poor air before we even arrive at our place of work.

We would like some empirical evidence to be gathered to demonstrate the impact of decision making and concentration on tasks of varying complexity in enclosed spaces where there are enhanced levels of CO₂ in the atmosphere. These tasks should



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be undertaken by individuals AND small teams. Ideally the activity should examine tasks that involve making decisions based upon written information AND more mobile activity such as conducting security inspections (and creating reports afterwards). We would also like to study whether there is an association between air quality and the number of security incidents, for example, people not adhering to the security protocols of a building and inadvertently causing security breaches. We would like to compare individual behaviour with that of group behaviour. We would be interested to know about any other airborne particles that could impact human performance in an office space.

The research will help us better design secure environments and provide optimal workspaces for individuals who spend prolonged periods in secure spaces. It will inform security policy and guidance.

Example Approaches:

- Inhalation of air with increased CO2 levels leads to poor cognitive functioning.
- The impact of pollution on human respiratory systems.

Possible future impacts of elevated levels of atmospheric CO2 on human cognitive performance and on the design and operation of ventilation systems in buildings - Robert J Lowe, Gesche M Huebner, Tadj Oreszczyn, 2018 (sagepub.com)

Key Words: Carbon Dioxide, building environments, cognitive performance, memory, decision making, psychology of security breaches.

Qualifications

Postdoc Eligibility

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the appointment start date
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

Research Advisor Eligibility

- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens







Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.

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- **Discipline(s):**

- **Chemistry and Materials Sciences** (12 )
- **Communications and Graphics Design** (3 )
- **Computer, Information, and Data Sciences** (17 )
- **Earth and Geosciences** (21 )
- **Engineering** (27 )
- **Environmental and Marine Sciences** (14 )
- **Life Health and Medical Sciences** (45 )
- **Mathematics and Statistics** (11 )
- **Other Non-Science & Engineering** (2 )
- **Physics** (16 )
- **Science & Engineering-related** (1 )
- **Social and Behavioral Sciences** (30 )