

APPENDIX I:
RECRUITMENT ADVERTISEMENT



**PENGAMBILAN
SUBJEK**
ANALISIS ELEKTROENSEFALOGRAM

TAJUK KAJIAN

MENEROKA HUBUNGKAIT ANTARA NEUROFISILOGI KETENANGAN DAN MEMORI KERJA YANG DIINDUKSI OLEH HARUMAN MELALUI ANALISIS ELEKTROENSEFALOGRAFI (EEG).



**SUBJECT
RECRUITMENT**
ELECTROENCEPHALOGRAM ANALYSIS

RESEARCH TITLE

"EXPLORING THE NEUROPHYSIOLOGICAL CORRELATES OF FRAGRANCE-INDUCED CALMNESS AND WORKING MEMORY"



Siapa Yang Kami Perlukan?

- ✓ PELAJAR BERUMUR ANTARA 18 - 25 TAHUN
- ✓ INDIVIDU YANG DOMINAN TANGAN KANAN
- ✓ BUKAN PEROKOK
- ✓ TIADA SEJARAH KECEDEeraan KEPALA/OTAK



Who Do We Need?

- ✓ STUDENT AGED BETWEEN 18 - 25
- ✓ RIGHT-HANDED PERSON
- ✓ NON-SMOKER
- ✓ NO HISTORY OF BRAIN INJURIES

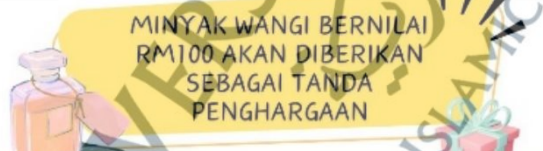
KRITERIA PENGECUALIAN !!!

- Sejarah kecederaan otak atau penyakit mental/psikiatri.
- Sejarah penyalahgunaan bahan.
- Kerosakan deria bau.
- Sejarah kecederaan kepala.
- Wanita hamil.
- Mempunyai alahan terhadap aroma/wangian tertentu.



Exclusion Criteria !!!

1. History of brain injuries or mental/psychiatric illnesses.
2. History of Substance Abuse.
3. Olfactory Impairment.
4. History of Head Injuries.
5. Pregnant Women.
6. Having Allergies to Specific Aroma/ Scent/Fragrances (any scent counted).



MINYAK WANGI BERNILAI RM100 AKAN DIBERIKAN SEBAGAI TANDA PENGHARGAAN

TEMPAT KAJIAN

Imaging & Neurosciences Analysis Laboratory, Tingkat 5, Fakulti Sains & Teknologi, Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan.

Adakah anda berminat untuk menjadi sukarelawan dalam kajian ini?

Hubungi:

Zaim: 011-61135730 / Dr. Sofina: 019-5754821



FRAGRANCES WORTH RM100 WILL BE GIVEN AS TOKEN OF APPRECIATION

VENUE

Imaging & Neurosciences Analysis Laboratory, Level 5, Faculty of Science & Technology, Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan.


Are you ready to start volunteering?

Contact:

Zaim: 011-61135730 / Dr. Sofina: 019-5754821

APPENDIX II: HANDEDNESS QUESTIONNAIRE

10/21/24, 9:56 AM
Handedness Questionnaire



SHARED SOFTWARE

Worldwide

- Imaging Researcher Directory
- Funding Opportunities
- Scientific Societies
- Manufacturers
- Journals
- Education
- Employment Opportunities
- MRI Safety
- Brain Mapping Links

UCLA Links

- UCLA Neuroimaging Faculty
- Education
- Cognitive Neuroscience Center
- UCLA Brain mapping Center
- MRI Tools
- How To... (Wiki)
- Volunteer Opportunities
- Information for Subjects

Handedness Questionnaire

Instructions
For each of the activities below, please indicate:

*Which hand you prefer for that activity?
Do you ever use the other hand for the activity?*

Which hand do you prefer to use when:	no pref	Do you ever use the other hand?	
Writing: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Drawing: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Throwing: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using Scissors: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using a Toothbrush: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using a Knife (without a fork): Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using a Spoon: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using a broom (upper hand): Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Striking a Match: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Opening a Box (holding the lid): Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
items below are not on the standard inventory:			
Holding a Computer Mouse: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Using a Key to Unlock a Door: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Holding a Hammer: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Holding a Brush or Comb: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes
Holding a Cup while Drinking: Left <input type="radio"/> <input type="radio"/> <input type="radio"/> Right	<input type="radio"/>	<input type="checkbox"/>	Yes

Evaluate


Laterality Index (LI)	Decile
LI = -100	10 th left
-100 ≤ LI < -92	9 th left
-92 ≤ LI < -90	8 th left
-90 ≤ LI < -87	7 th left
-87 ≤ LI < -83	6 th left
-83 ≤ LI < -76	5 th left
-76 ≤ LI < -66	4 th left
-66 ≤ LI < -54	3 rd left
-54 ≤ LI < -42	2 nd left
-42 ≤ LI < -28	1 st left
-28 ≤ LI < 48	Middle
48 ≤ LI < 60	1 st right
60 ≤ LI < 68	2 nd right
68 ≤ LI < 74	3 rd right
74 ≤ LI < 80	4 th right
80 ≤ LI < 84	5 th right
84 ≤ LI < 88	6 th right
88 ≤ LI < 92	7 th right
92 ≤ LI < 95	8 th right
95 ≤ LI < 100	9 th right
LI = 100	10 th right

This handedness questionnaire was adapted from:
Oldfield, R.C. "The assessment and analysis of handedness: the Edinburgh inventory." *Neuropsychologia*, 9(1) 1971.

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[FAQ and HELP](#)

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We appreciate ideas to make brainmapping.org more useful. Submit your suggestions for changes and links here: [sug]



<https://www.brainmapping.org/shared/Edinburgh.php>

APPENDIX III:
MULTIFACTORIAL MEMORY QUESTIONNAIRE

**Multifactorial
Memory
Questionnaire**

How I Feel About My Memory

Name: _____ Date: _____

Below are statements about feelings that people may have about their memory. Read each statement and think about your feelings over the past two weeks. Then, check the box next to the response that best describes how much you agree or disagree.

1. I am generally pleased with my memory ability.

Strongly Agree Agree Undecided Disagree Strongly Disagree

2. There is something seriously wrong with my memory.

Strongly Agree Agree Undecided Disagree Strongly Disagree

3. If something is important, I will probably remember it.

Strongly Agree Agree Undecided Disagree Strongly Disagree

4. When I forget something, I fear that I may have a serious memory problem, like Alzheimer's disease.

Strongly Agree Agree Undecided Disagree Strongly Disagree

5. My memory is worse than most other people my age.

Strongly Agree Agree Undecided Disagree Strongly Disagree

6. I have confidence in my ability to remember things.

Strongly Agree Agree Undecided Disagree Strongly Disagree

7. I feel unhappy when I think about my memory ability.

Strongly Agree Agree Undecided Disagree Strongly Disagree

8. I worry that others will notice that my memory is not very good.

Strongly Agree Agree Undecided Disagree Strongly Disagree

9. When I have trouble remembering something, I'm not too hard on myself.

Strongly Agree Agree Undecided Disagree Strongly Disagree

Please turn page over to complete the questionnaire.

10. I am concerned about my memory.

Strongly Agree Agree Undecided Disagree Strongly Disagree

11. My memory is really going downhill lately.

Strongly Agree Agree Undecided Disagree Strongly Disagree

12. I am generally satisfied with my memory ability.

Strongly Agree Agree Undecided Disagree Strongly Disagree

13. I don't get upset when I have trouble remembering something.

Strongly Agree Agree Undecided Disagree Strongly Disagree

14. I worry that I will forget something important.

Strongly Agree Agree Undecided Disagree Strongly Disagree

15. I am embarrassed about my memory ability.

Strongly Agree Agree Undecided Disagree Strongly Disagree

16. I get annoyed or irritated with myself when I am forgetful.

Strongly Agree Agree Undecided Disagree Strongly Disagree

17. My memory is good for my age.

Strongly Agree Agree Undecided Disagree Strongly Disagree

18. I worry about my memory ability.

Strongly Agree Agree Undecided Disagree Strongly Disagree

Calculation:

$$\text{Score} = \text{Number of Possible Items} \times \frac{\text{Obtained Score}}{\text{Number of Completed Items}}$$

Multifactorial Memory Questionnaire: Satisfaction Scale (formerly Contentment Scale)
© Baycrest Centre for Geriatric Care 2002, 2016

Baycrest

Memory Mistakes

Name: _____ Date: _____

Below is a list of common memory mistakes that people make. Decide how often you have done each one in the *last two weeks*. Then, check the box next to the appropriate response.

1. Forget to pay a bill on time.

All the Time Often Sometimes Rarely Never

2. Misplace something you use daily, like your keys or glasses.

All the Time Often Sometimes Rarely Never

3. Have trouble remembering a telephone number you just looked up.

All the Time Often Sometimes Rarely Never

4. Not recall the name of someone you just met.

All the Time Often Sometimes Rarely Never

5. Leave something behind when you meant to bring it with you.

All the Time Often Sometimes Rarely Never

6. Forget an appointment.

All the Time Often Sometimes Rarely Never

7. Forget what you were just about to do; for example, walk into a room and forget what you went there to do.

All the Time Often Sometimes Rarely Never

8. Forget to run an errand.

All the Time Often Sometimes Rarely Never

9. In conversation, have difficulty coming up with a specific word that you want.

All the Time Often Sometimes Rarely Never

Please turn page over to complete the questionnaire.

10. Have trouble remembering details from a newspaper or magazine article you read earlier that day.

All the Time Often Sometimes Rarely Never

11. Forget to take medication.

All the Time Often Sometimes Rarely Never

12. Not recall the name of someone you have known for some time.

All the Time Often Sometimes Rarely Never

13. Forget to pass on a message.

All the Time Often Sometimes Rarely Never

14. Forget what you were going to say in conversation.

All the Time Often Sometimes Rarely Never

15. Forget a birthday or anniversary that you used to know well.

All the Time Often Sometimes Rarely Never

16. Forget a telephone number you use frequently.

All the Time Often Sometimes Rarely Never

17. Retell a story or joke to the same person because you forgot you already told him or her.

All the Time Often Sometimes Rarely Never

18. Misplace something that you put away a few days ago.

All the Time Often Sometimes Rarely Never

19. Forget to buy something you intended to buy.

All the Time Often Sometimes Rarely Never

20. Forget details about a recent conversation.

All the Time Often Sometimes Rarely Never

Multifactorial Memory Questionnaire: Ability Scale
© Baycrest Centre for Geriatric Care 2002, 2016

Baycrest

Use of Memory Strategies

Name: _____ Date: _____

People often use different tricks or strategies to help them remember things. Several strategies are listed below. Decide how often you used each one in the *last two weeks*. Then, check the box next to the appropriate response.

1. Use a timer or alarm to remind you when to do something.
 All the Time Often Sometimes Rarely Never

2. Ask someone to help you remember something or to remind you to do something.
 All the Time Often Sometimes Rarely Never

3. Create a rhyme out of what you want to remember.
 All the Time Often Sometimes Rarely Never

4. In your mind, create an image of something you want to remember, like a name and face.
 All the Time Often Sometimes Rarely Never

5. Write things on a calendar, such as appointments or things you need to do.
 All the Time Often Sometimes Rarely Never

6. Go through the alphabet one letter at a time to see if it sparks a memory for a name or word.
 All the Time Often Sometimes Rarely Never

7. Organize information you want to remember; for example, organize your grocery list according to food groups.
 All the Time Often Sometimes Rarely Never

8. Say something out loud in order to remember it, such as a phone number you just looked up.
 All the Time Often Sometimes Rarely Never

9. Use a routine to remember important things, like checking that you have your wallet and keys when you leave home.
 All the Time Often Sometimes Rarely Never

Please turn page over to complete the questionnaire.

Score Interpretation:

SCORE RANGE	INTERPRETATION
Below 20	Very low
20-29	Low
30-39	Below average
40-60	Average
60-70	Above average
71-80	High
Above 80	Very high

**APPENDIX IV:
INFORMATION COLLECTION FORM**

INFORMATION COLLECTION FORM

TITLE OF THE PROJECT:

Exploring The Neurophysiological Correlates of Fragrance-Induced Calmness & Working Memory Through Electroencephalogram (EEG) Analysis.

1. Personal Information

Full Name: _____

Date of Birth: _____

Gender: Male / Female

Nationality: _____

Religion: _____

Phone Number: _____

Email Address: _____

Address: _____

2. Educational Background

Current Level of Education: _____

Institution(s) Attended: _____

Field(s) of Study: _____

Current Semester: _____

Date of Graduation (expected): _____

**APPENDIX V:
BEHAVIORAL ASSESSMENT**

3. Questions about Smell & Fragrance (Research Purpose)

1. Are there any specific scents or fragrances that you find particularly calming or soothing?

2. Do you have any allergies or sensitivities to certain fragrances or ingredients commonly found in fragrances? If yes, please specify.

3. Out of these 3 fragrances, which one do you typically find most pleasant or enjoyable?

4. How would you rate your sensitivity to different fragrances on a scale of 1 to 5? (1 being not sensitive at all, 5 being highly sensitive)

5. Can you recall a specific scent or fragrance that holds strong positive associations for you (e.g., childhood memories, special occasions)? If so, please describe.

6. Are there any scents or fragrances that you actively avoid or dislike? If yes, please specify.

7. Have you ever used fragrances specifically for relaxation or stress relief purposes? If so, which ones have you found most effective?

8. Do you believe that fragrances can have an impact on your mood or emotions? If yes, in what ways?

**APPENDIX VI:
CONSENT FORM**

CONSENT

By signing below, you consent to the collection and use of the information provided in this form for the purposes stated above.

I.....

(ic number:),

Addressed at

have read the information on the research project stated above and have also been explained by the person in charge about the purpose of this document. I have been adequately informed about the purpose, set-up, course, and risk of the study. At any time during and after my participation in the study, I am aware that the investigator is responsible for providing me with any additional information about the study as well as in case of study-related injury. I also have the right to know about the research conducted, including information on the results of the research.

I hereby agree/ disagree to participate in this study.

Signature of the subject:

Date :

Contact number:

Name of researcher:

Signature:

Date:

Instructions for Form Submission:

- Please complete all sections of this form to the best of your ability.
- Submit the completed form via email to [zaimkashfi@gmail.com] or return it to [Imaging and Neuroscience Analysis Laboratory, Level 5, Faculty of Science & Technology, Universiti Sains Islam Malaysia, USIM, Nilai, Negeri Sembilan].
- For any questions or assistance, contact 011-61135730 (Zaim) / zaimkashfi@gmail.com

APPENDIX VII:
ETHICAL APPROVAL LETTER



Jawatankuasa Etika
Penyelidikan Manusia USM (JEPeM)
Human Research Ethics Committee USM (HREC)

Universiti Sains Malaysia
Kampus Kesihatan
16150 Kubang Kerian, Kelantan, Malaysia.
Tel. : +609 - 767 3000/2354/2362
Fax : + 609 - 767 2351
Email : jepem@usm.my
Laman Web : www.jepem.kk.usm.my
www.usm.my

16th April 2025

Dr. Sofina Tamam
Faculty of Science and Technology
Universiti Sains Islam Malaysia
A1-054, Universiti Sains Islam
71800 Nilai, Negeri Sembilan.

JEPeM Code : USM/JEPeM/KK/24121070

Protocol Title: Exploring the Neurophysiological Correlates of Fragrance-Induced Calmness and Working Memory Through Electroencephalography (EEG) Analysis.

Dear Dr.,

We wish to inform you that your study protocol has been reviewed and is hereby granted approval for implementation by the Jawatankuasa Etika Penyelidikan Manusia Universiti Sains Malaysia (JEPeM-USM). Your study has been assigned study protocol code **USM/JEPeM/KK/24121070**, which should be used for all communications to JEPeM-USM in relation to this study. This ethical approval is valid from **16th April 2025** until **15th April 2026**.

Study Site: Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan.

The following researchers are also involved in this study:

1. Prof. Ts. Dr. Norita Md Norwawi
2. Dr. Aini Ismafairus Abd Hamid
3. Mr Muhammad Zaim Kashfi Zaman

The following documents have been approved for use in the study.

1. Research Proposal

In addition to the abovementioned documents, the following technical documents were included in the review on which this approval was based:

1. Participant Information Sheet and Consent Form (English version)
2. Participant Information Sheet and Consent Form (Malay version)
3. Questionnaires
4. Data Collection Form

The list of JEPeM-USM members present during the full board meeting reviewing your protocol is attached.

While the study is in progress, we request you to submit to us the following documents:

1. Application for renewal of ethical approval 45 days before the expiration date of this approval through submission of **JEPeM-USM FORM 3(B) 2022: Continuing Review Application Form**.
2. Any changes in the protocol, especially those that may adversely affect the safety of the participants during the conduct of the trial including changes in personnel, must be submitted or reported using **JEPeM-USM FORM 3(A) 2022: Study Protocol Amendment Submission Form**.
3. Revisions in the informed consent form using the **JEPeM-USM FORM 3(A) 2022: Study Protocol Amendment Submission Form**.
4. Reports of adverse events including from other study sites (national, international) using the **JEPeM-USM FORM 3(G) 2022: Adverse Events Report**.



5. Notice of early termination of the study and reasons for such using **JEPeM-USM FORM 3(E) 2022**.
6. Any event which may have ethical significance.
7. Any information which is needed by the JEPeM-USM to do ongoing review.
8. Notice of time of completion of the study using **JEPeM-USM FORM 3(C) 2022: Final Report Form**.

Please note that forms may be downloaded from the JEPeM-USM website:
<https://jepem.kk.usm.my/>

JEPeM-USM is in compliance with the Declaration of Helsinki, International Conference on Harmonization (ICH) Guidelines, Good Clinical Practice (GCP) Standards, Council for International Organizations of Medical Sciences (CIOMS) Guidelines, World Health Organization (WHO) Standards and Operational Guidance for Ethics Review of Health-Related Research and Surveying and Evaluating Ethical Review Practices, EC/IRB Standard Operating Procedures (SOPs), and Local Regulations and Standards in Ethical Review.

Thank you.

"MALAYSIA MADANI"

"BERKHIDMAT UNTUK NEGARA"

Sincerely,



ASSOC. PROF. DR. AZLAN HUSIN
Chairperson
Jawatankuasa Etika Penyelidikan (Manusia) JEPeM
Universiti Sains Malaysia

**APPENDIX VIII:
SUPPLEMENTAL EEG RESULTS**

FRAGRANCE A:

Electrode	Beta Before	Beta After	Alpha Before	Alpha After	Theta Before	Theta After
EEG 1 (Fz)	21.223	18.308	34.69	40.21	78.74	74.97
EEG 2 (C3)	17.727	23.202	31.844	35.796	90.648	61.555
EEG 3 (Cz)	20.327	29.274	30.478	40.618	67.122	49.392
EEG 4(C4)	20.498	24.678	35.134	32.461	67.937	92.641
EEG 5 (Pz)	28.363	25.528	33.66	37.96	75.12	72.70
EEG 6 (PO7)	26.795	20.823	33.15	37.00	72.24	66.45
EEG 7 (Oz)	26.355	30.672	35.413	30.09	90.967	59.483
EEG 8 (PO8)	25.231	30.292	33.30	36.24	77.47	73.18

FRAGRANCE B:

Electrode	Beta Before	Beta After	Alpha Before	Alpha After	Theta Before	Theta After
EEG 1 (Fz)	18.93	14.712	33.94	40.08	73.54	73.13
EEG 2 (C3)	19.526	15.277	30.703	37.241	63.27	59.111
EEG 3 (Cz)	18.305	14.169	31.551	38.571	71.912	67.462
EEG 4(C4)	20.103	15.22	30.81	37.109	74.521	60.4
EEG 5 (Pz)	17.411	13.92	34.49	40.23	73.37	74.54
EEG 6 (PO7)	18.261	14.33	34.79	39.60	68.58	66.56
EEG 7 (Oz)	19.701	13.812	34.666	41.929	73.563	69.62
EEG 8 (PO8)	18.633	13.421	33.28	37.94	71.26	72.28

FRAGRANCE C:

Electrode	Beta Before	Beta After	Alpha Before	Alpha After	Theta Before	Theta After
EEG 1 (Fz)	25.637	22.732	34.00	37.32	71.98	66.00
EEG 2 (C3)	21.094	22.963	35.985	32.724	98.429	80.169
EEG 3 (Cz)	28.655	30.494	33.298	34.635	86.02	84.62
EEG 4(C4)	16.839	27.697	35.067	50.227	96.799	62.425
EEG 5 (Pz)	26.859	29.876	37.00	38.09	72.49	70.73
EEG 6 (PO7)	26.018	26.693	35.33	37.27	65.46	63.17
EEG 7 (Oz)	27.612	26.686	40.706	38.591	87.621	83.623
EEG 8 (PO8)	29.342	29.819	34.80	36.11	66.22	64.44

PLACEBO:

Electrode	Beta Before	Beta After	Alpha Before	Alpha After	Theta Before	Theta After
EEG 1 (Fz)	17.014	16.981	33.01	33.12	78.67	78.68
EEG 2 (C3)	25.014	24.992	37.99	38.092	107.01	106.906
EEG 3 (Cz)	25.335	25.207	34	34.013	54.3	54.232
EEG 4(C4)	28.022	27.981	35.335	35.221	105.1	107
EEG 5 (Pz)	29.772	29.88	36.31	36.47	74.87	74.75
EEG 6 (PO7)	20.113	20.099	34.22	34.02	71.02	71.10
EEG 7 (Oz)	24.921	25.711	50.781	48.88	87.55	87.604
EEG 8 (PO8)	23.4	23.022	33.12	33.06	64.43	64.21

LIST OF PUBLICATIONS AND PRESENTATIONS

1. Sazali, S. N. A., Zaman, M. Z. K., Tamam, S., Sharif, E. A. M., & Kamal, M. A. M. (2025). The Relationship Between Brain Wave Power Value of Pain Perception and Empathy Using The Electroencephalogram (EEG). *Malaysian Journal of Science Health & Technology*, 11(1), 26-33.
2. Zaman, M. Z. K., & Tamam, S. (2025). Identification of Chemical Profiles of Aromatherapeutic Compounds in Commercial Fragrances and Their Potential to Modulate Emotional States. *Malaysian Journal of Science Health & Technology*, 11(2).
3. Zaman, M. Z. K., & Tamam, S. (2025). A Review of the Technological Advancements in Detecting Lung Cancer Severity Among the Malaysian Population.
4. Zaman, M. Z. K., & Tamam, S. (2025). EEG Alpha and Theta Power Modulation During Fragrance Exposure: Insights into the Neural Correlates of Calmness.
5. Presenter in INNOMED Innovation Pitching 2024 (Gold Award).
6. Presenter in the Postgraduate Seminar, Faculty of Science & Technology (KoSIST 2022).