

“EEGHUB.GE” The Electroencephalogram Brain Electrical Activity Database

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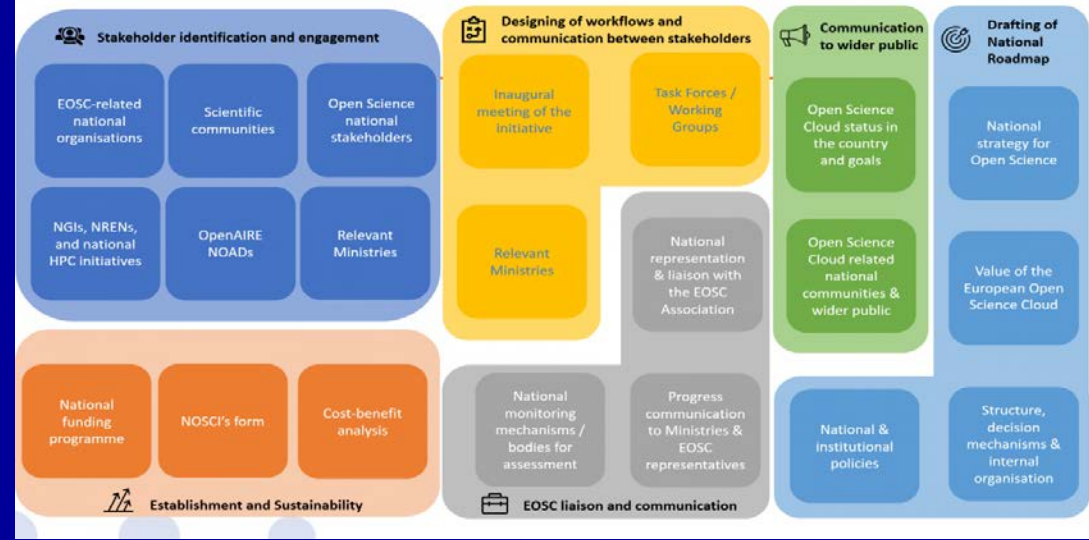


TOPICS:

- ❖ “EEGHUB.GE”
- ❖ The first online EEG database in Georgia funded by NI4OS
- ❖ <https://eeghub.ge/>
- ❖ Scopes and FAIR demands
- ❖ Thematic service demo-
- ❖ Brain’s Electrical Activity

EEG (Electroencephalogram)





- EEG (Electroencephalography-Brain electrical activity) data collected in Georgia have been uploaded to the European Open Science Cloud (EOSC) for the first time
- NI4OS-Europe project selected “**EEGHUB.GE**” as a **thematic service**, Ivane Beritashvili Center of Experimental Biomedicine Irma Khachidze (lead EEGHUB.GE service)



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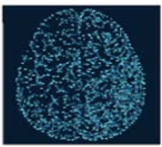
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Ivane Beritashvili Center of Experimental Biomedicine	



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NOA	National Observatory of Athens	NOA	Published	
ICI	National Institute for Research and Development in Informatics	ICI	Published	
IBCEB	Ivane Beritashvili Center of Experimental Biomedicine	IBCEB	Published	
IPB	Institute of Physics Belgrade	IPB	Published	
UKIM, FNSM	University Ss. Cyril and Methodius, Faculty of Natural Science and Mathematics	UKIM, FNSM	Published	
SRCE	University of Zagreb, University Computing Centre (SRCE)	SRCE	Published	
IJF	Institute of Public Finance, Zagreb	IJF	Published	



Georgian Society for
Psychophysiological Research

“EEGHUB.GE”

Big Data EEG

**The first online EEG dataset in
Georgia**

<https://eeghub.ge/>

EU Project scopes to get the full benefits of data driven science for European scientists and promote advantages/benefits of computer network resources to researchers
Provide wide opportunity & raise awareness on the field of education, science, infrastructures, services and culture



- The service is free for European and national researchers, based on EOSC FIAR principles
 - *Findable,*
 - *Accessible,*
 - *Interoperable*
 - *and Reusable.*

• Scientists, physicians, psychologists, IT and etc. have free access to the EEG data

facilitates the implementation of new teaching & scientific approaches that are used not only in Georgian but also by international stakeholders (researchers, lecturers, students and etc.) from various educational, research, and clinical organizations

GRENA

GEORGIAN RESEARCH AND EDUCATIONAL
NETWORKING ASSOCIATION

- The project is being implemented by the infrastructure of Georgian Research and Educational Networking Association “GRENA”, headed by Ramaz Kvatadze.
- With the help of “GRENA” a thematic service - EEGHUB.GE was integrated in the EOSC-**European Open Science Cloud**
- Provided technical support /expertise and computer resources- Cloud infrastructure for the creation of EEG database portal



“EEGHUB.GE” Database Consists :



- 1913 EEG recording of humans: healthy subjects and patients with different neurological, psychiatric etc. disorders has been collected during 15 years from I.Beritashvili Center of Experimental Biomedicine & David Tatishvili Medical Center, Tbilisi. Georgia
- **Age-related categories:** *1- 75 years old*
1-3, 3-6, 7-12, 13-18, 19-25, 26-50, 51 & above
- **Gender:** *male and female*
- Sleep EEG recordings of children under 3 years old
Pathological EEG with different brain dysfunction
for example: epilepsy, encephalopathy, ADHD, stroke and etc.

Male/Female

1052- male

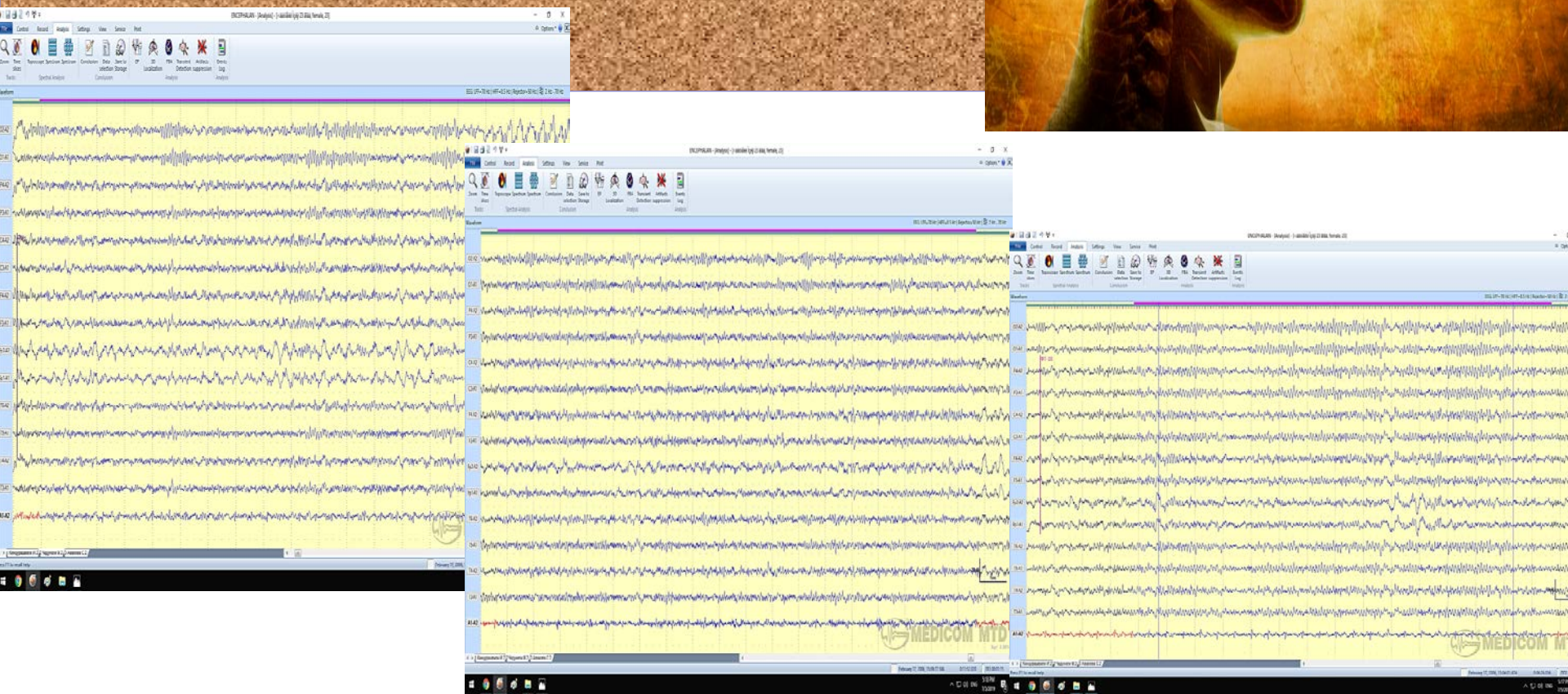
1913

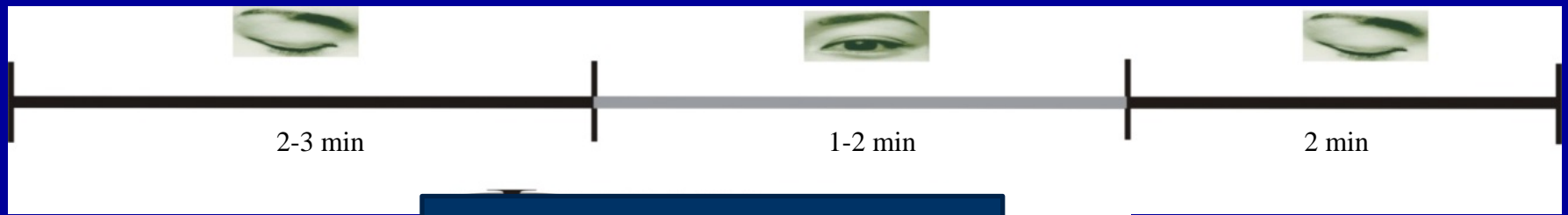
861-female

- 0-3 years old 151;
- 4-6 y 162;
- 7-12 y 343;
- 13-18 y 185;
- 19-25 y 78;
- 26-50 y 104;
- 51 y above 29

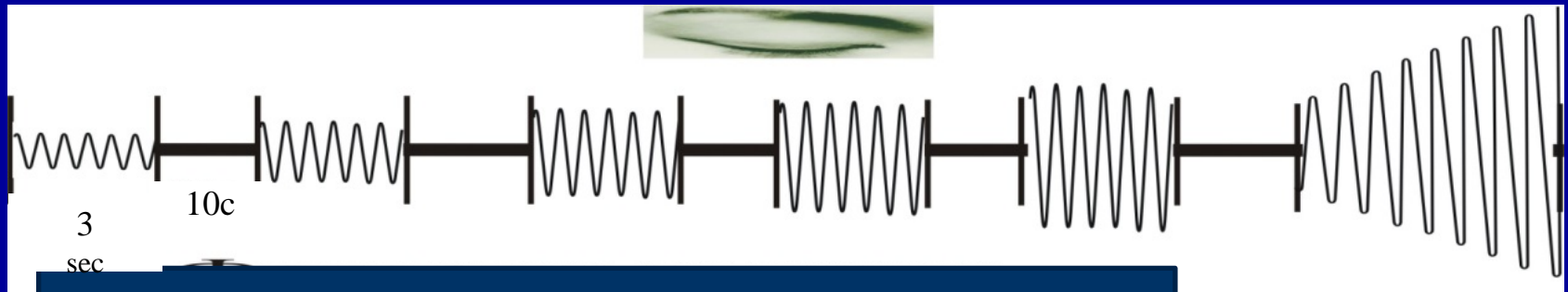
- 0-3 Years old 106;
- 4-6 y 124;
- 7-12 y 279;
- 13-18 y 129;
- 19-25 y 84;
- 26-50 y 112;
- 51 y 27

- EEG recordings continues 25-30 minutes.
- Background EEG activity with open & closed eyes
- Functional samples:
- Photo-stimulation and Hyperventilation

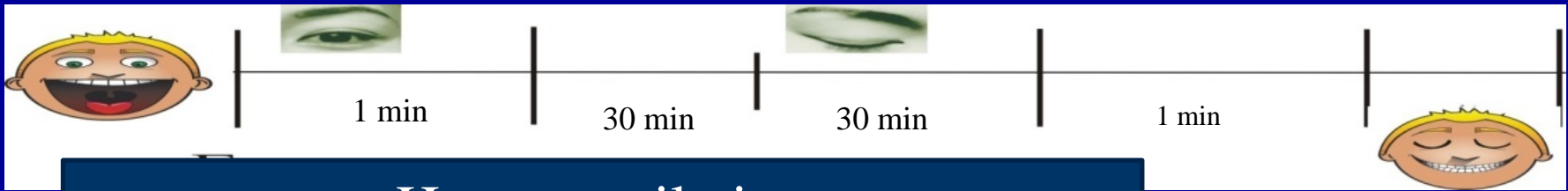




Background



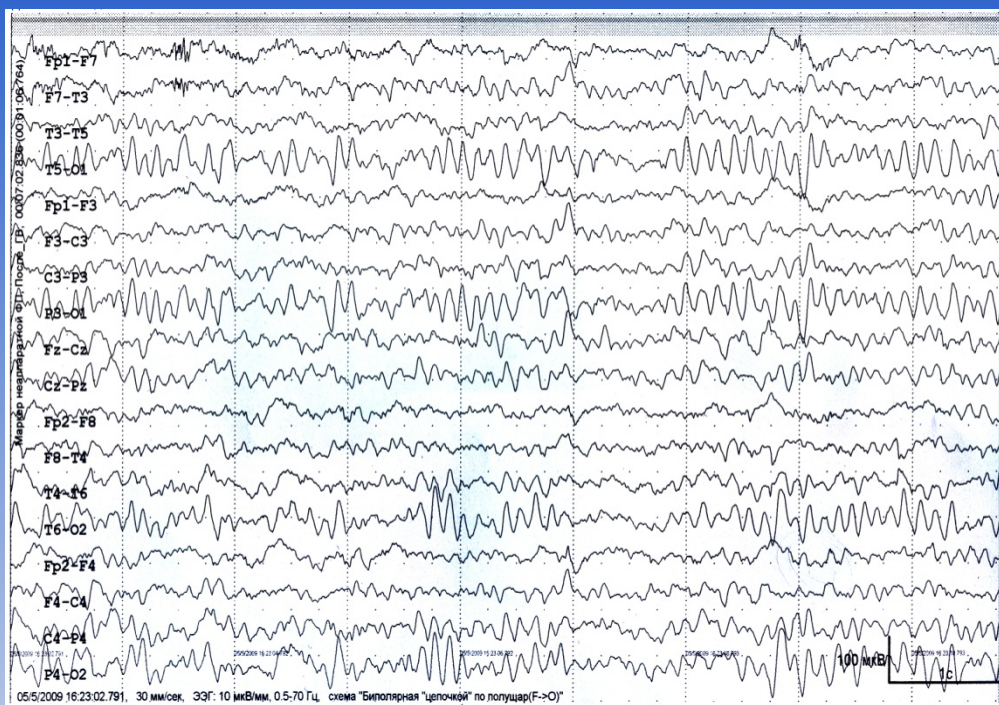
Photostimulation



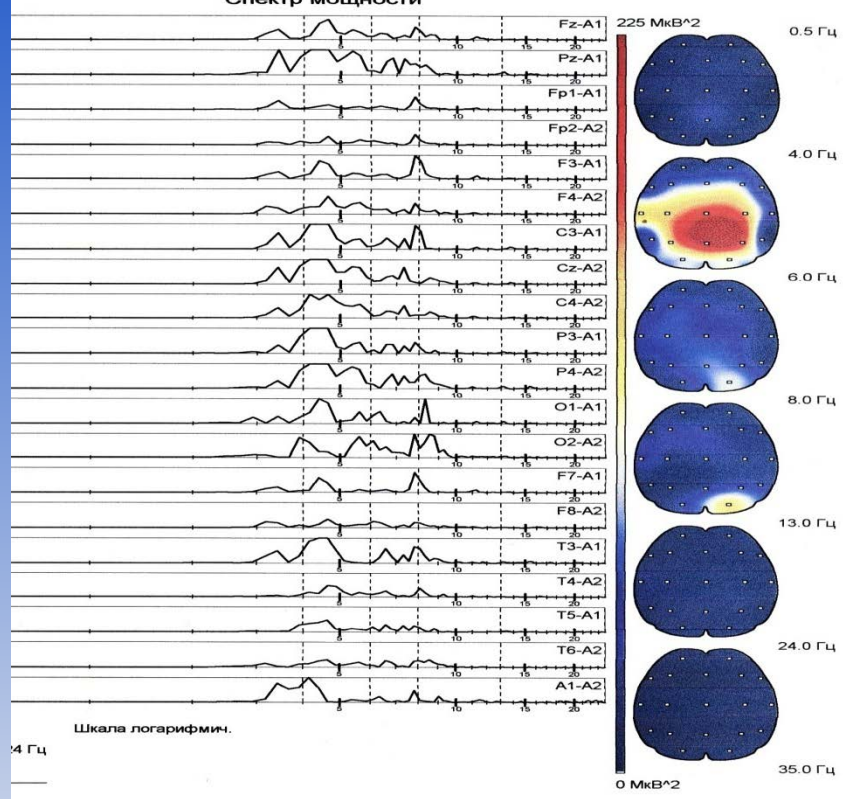
Hyperventilation



Resting State



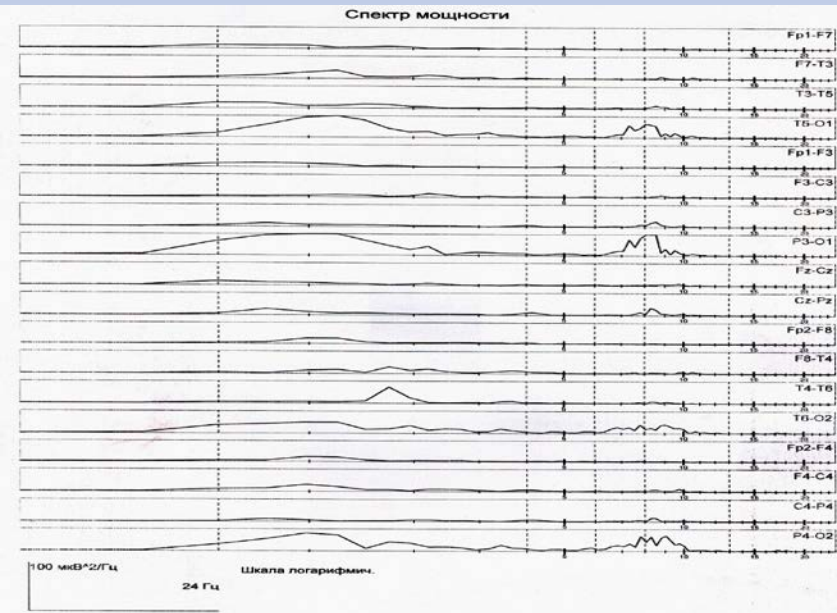
05/5/2009 16:23:02.791, 30 мм/сек, ЭЭГ: 10 мкВ/мм, 0.5-70 Гц, схема "Биполарная "цепочкой" по полушар(Ф->О)"



Шкала логарифмич.

4 Гц

Frequency	Absolute value of power spectra						
	дегта	гета 1	гета 2	алфа	бета 1	бета 2	гамма
Fp1-A1	342.60	35.72	25.98	26.54	10.67	4.82	446.33
Fp2-A2	334.20	24.40	34.22	30.81	13.30	5.46	442.40
F7-A1	191.91	37.19	40.60	29.57	15.81	8.57	323.64
F3-A1	208.40	49.91	42.44	47.08	15.97	5.46	369.26
Fz-A1	238.23	50.48	44.93	72.78	15.99	5.75	428.15
F4-A2	216.13	40.48	54.39	59.95	17.25	6.43	394.63
F8-A2	219.31	37.66	51.50	40.57	14.89	6.73	370.66
T3-A1	141.56	52.58	40.28	63.76	12.83	4.73	315.73
C3-A1	166.63	69.00	55.15	72.12	15.32	4.90	383.12
Cz-A2	204.97	87.89	92.44	117.14	21.23	6.17	529.83
C4-A2	174.63	63.44	71.59	79.96	17.48	5.66	412.76
T4-A2	166.24	31.00	36.09	44.64	12.26	6.68	296.93
T5-A1	124.77	43.92	35.31	48.50	9.35	4.34	266.19
P3-A1	154.30	65.00	89.48	68.84	11.57	4.77	393.95
Pz-A1	243.01	87.78	131.65	87.56	15.89	5.54	571.43
P4-A2	178.37	74.78	142.11	81.38	21.46	5.88	503.97
T6-A2	145.22	35.78	63.86	43.06	15.68	6.76	310.35
O1-A1	233.13	79.93	338.89	142.82	19.96	6.24	820.97
O2-A2	255.28	83.25	336.15	185.57	26.06	7.37	893.67
Сумма	3938.90	1050.19	1727.04	1342.64	302.98	112.26	

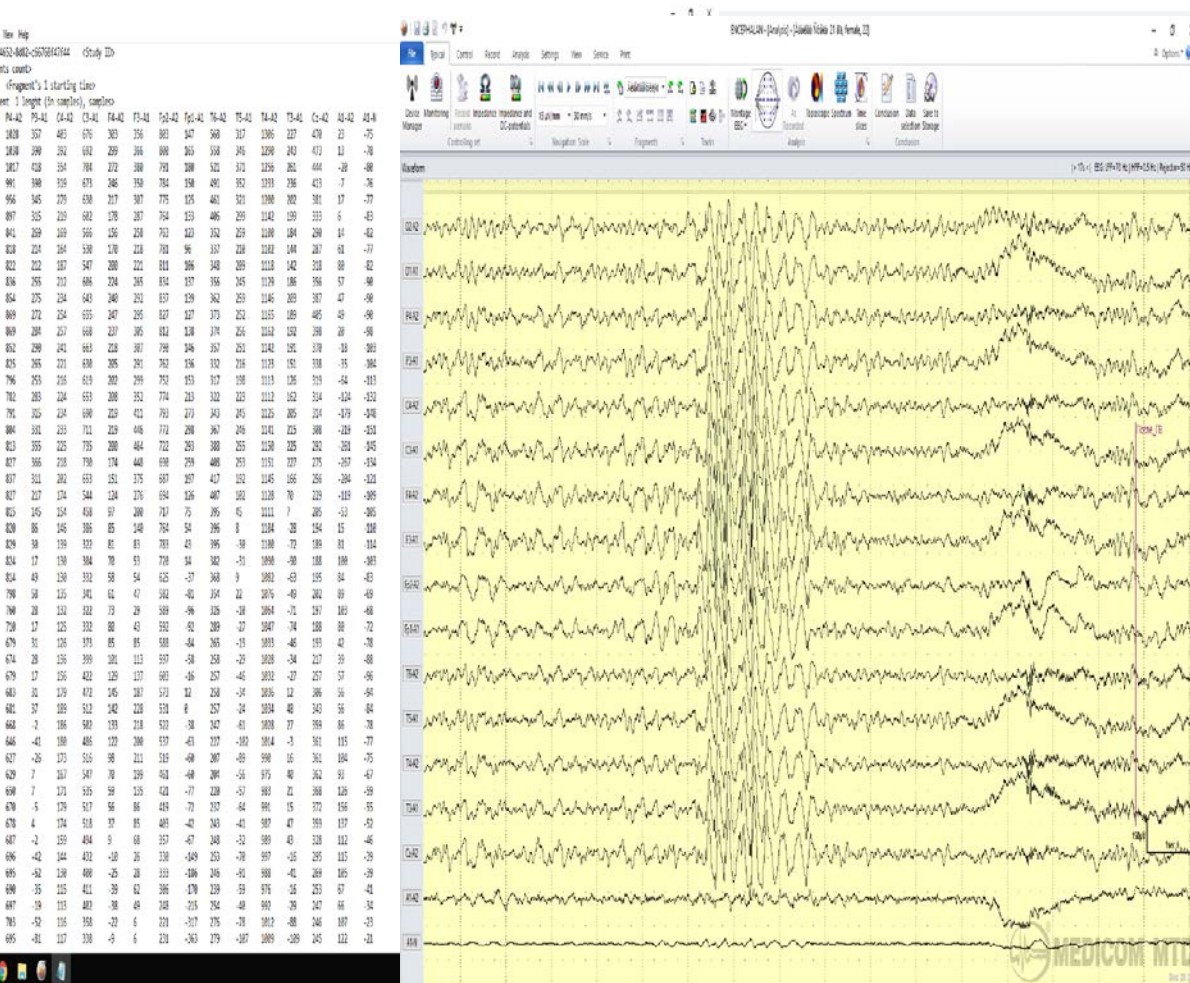


Шкала логарифмич.

24 Гц



The online EEG database is systematized, placed & stored in EDF format



EEGHUB

Electrical activity recording, registered with the background activity and functional sampling

Pathology Recording data or period Number of a

		Age	Gender	Normal Pathology	Recording date
EDF	TXT	13-18	Male		2009-09-07
EDF	TXT	13-18	Male		2010-10-13
EDF	TXT	13-18	Female		2010-10-25
EDF	TXT	13-18	Male		2010-07-07
EDF	TXT	13-18	Female		2010-04-14
EDF	TXT	13-18	Male		2010-04-20
EDF	TXT	13-18	Female		2009-09-16
EDF	TXT	13-18	Female		2010-06-09
EDF	TXT	13-18	Female		2010-05-05
EDF	TXT	13-18	Male		2010-06-15
EDF	TXT	13-18	Female		2009-11-07
EDF	TXT	13-18	Female		2010-05-24
EDF	TXT	13-18	Male		2010-05-19
EDF	TXT	13-18	Male		2009-11-21
EDF	TXT	13-18	Female		2009-09-04



EEGHUB

Normal and pathological brainwave electrical activity recording, registered with the background activity and functional samples of EEG

[Manual](#)[Video example](#)[EDFbrowser \(teuniz.net\)](#)

Check these boxes to search age gender and normal/pathological appropriate data

Age

Gender

Normal/Pathology



EEGHUB

Normal and pathological brainwave electrical activity recording, registered with the background activity and functional samples of EEG

[Manual](#)[Video example](#)[EDFbrowser \(teuniz.net\)](#)

Check these boxes to search age gender and normal/pathological appropriate data

Age Gender Normal/Pathology

[Search](#)

Patient code	Age	Gender	Normal Pathology	Number of visits	Pharmacotherapy	Recording date
36	7-12	Female	Pathology	1		2004-07-01
70	7-12	Female	Pathology	2	Depakine	2004-07-09
2	7-12	Female	Pathology	1		2004-07-12
54	7-12	Female	Pathology	1	Amitriptyline	2004-07-13
58	7-12	Female	Pathology	2	Noofen	2004-07-19
24	7-12	Female	Pathology	1	Depakine	2004-07-20
52	7-12	Female	Pathology	1		2004-07-27
25	7-12	Female	Pathology	4		2004-07-28

Patient code	Age	Gender	Normal Pathology	Number of visits	Pharmacotherapy	Recording date
19	13-18	Male	Pathology	1		2004-06-29
22	13-18	Male	Pathology	1		2004-07-01
20	13-18	Male	Pathology	1		2004-07-13
47	13-18	Male	Pathology	1	Depakine	2004-07-13
32	13-18	Female	Pathology	1	Cavinton+Sonapax	2004-07-15
27	13-18	Male	Pathology	1	Finlepsin	2004-07-26
49	13-18	Female	Pathology	1	Atarax	2004-07-28
44	13-18	Female	Pathology	2	Finlepsin	2004-08-02

Swedish Research Links (VR-SRL) program run by Swedish Research Council –Machin learning

- “A computational infrastructure for high-throughput analysis of large volume of brain signal data”

International collaborators

- Royal Institute of Technology (KTH), Stockholm, Sweden;
- Eastern European National University, Lutsk and Kiev University, Ukraine;
- Georgian Society for Psychophysiological Research, & I. Beritashvili Center of experimental Biomedicine ,Tbilisi, Georgia;



Irma Khachidze is the winner of the EYR @ EaP2018 program of the EU EaPConnect project program.

- 3rd Conference of Electronic Infrastructure in the frame of Eastern Partnership
- EaPConnect project and its 'Enlighten Your Research' program.
- Facilitates preparing the ground for novel computational methods to study different brain disorders in Georgia

Eastern Partnership Connect



CONNECT

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PUBLICATIONS & VIDEO IN EU

IN THE FIELD

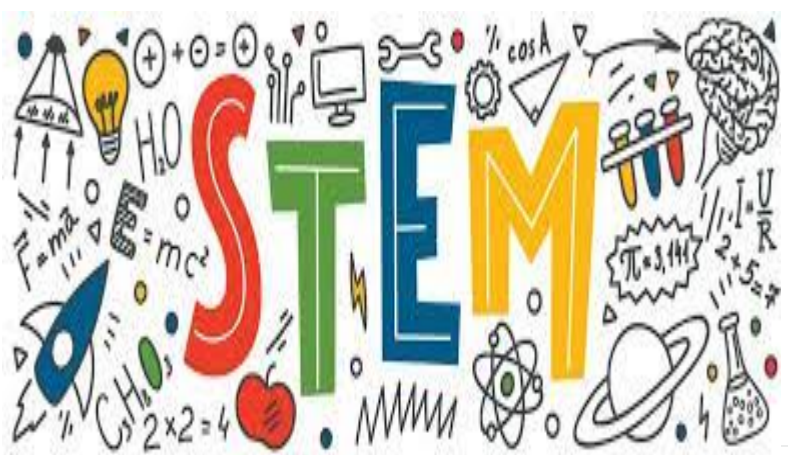
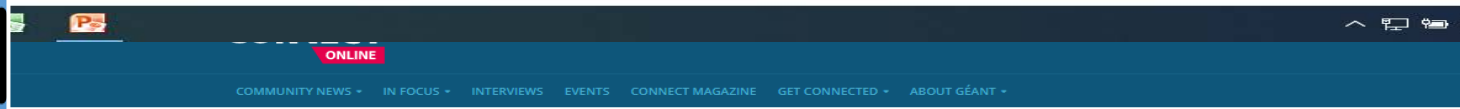


EU4Digital



Thanks
T. Gvenetadze

activity is
continuously
ongoing



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for future generations
1 day ago



Science,
technology
engineering
mathematics

Acknowledgment

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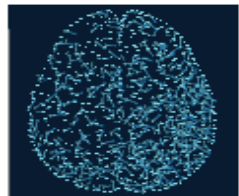


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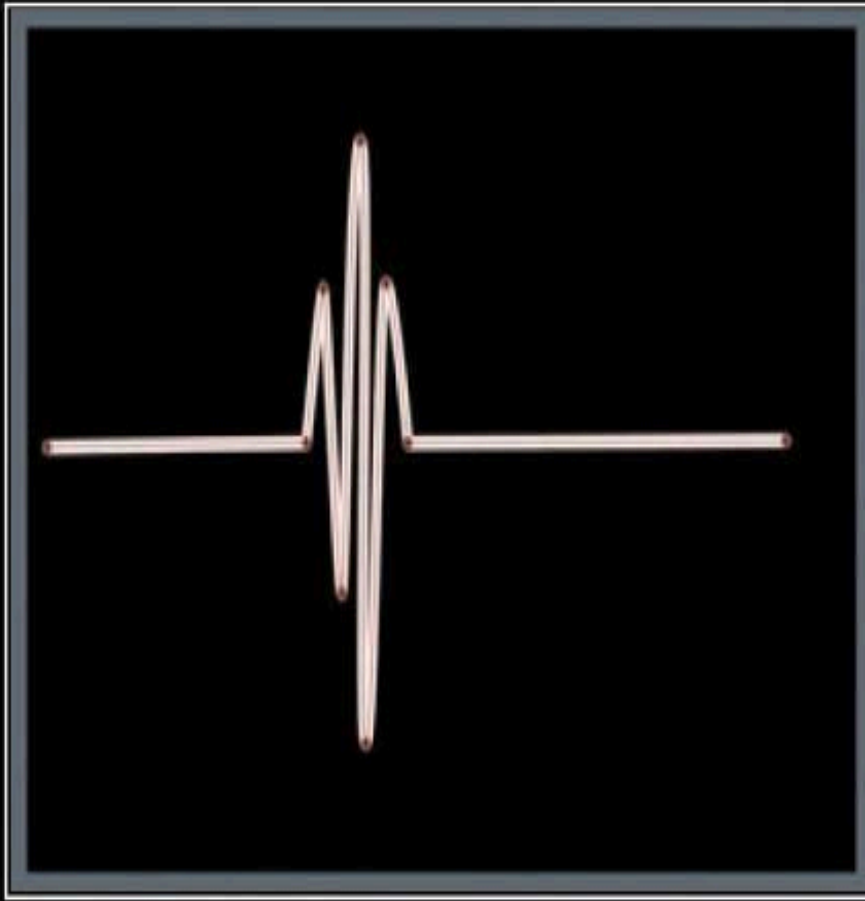
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Tbilisi, Georgia



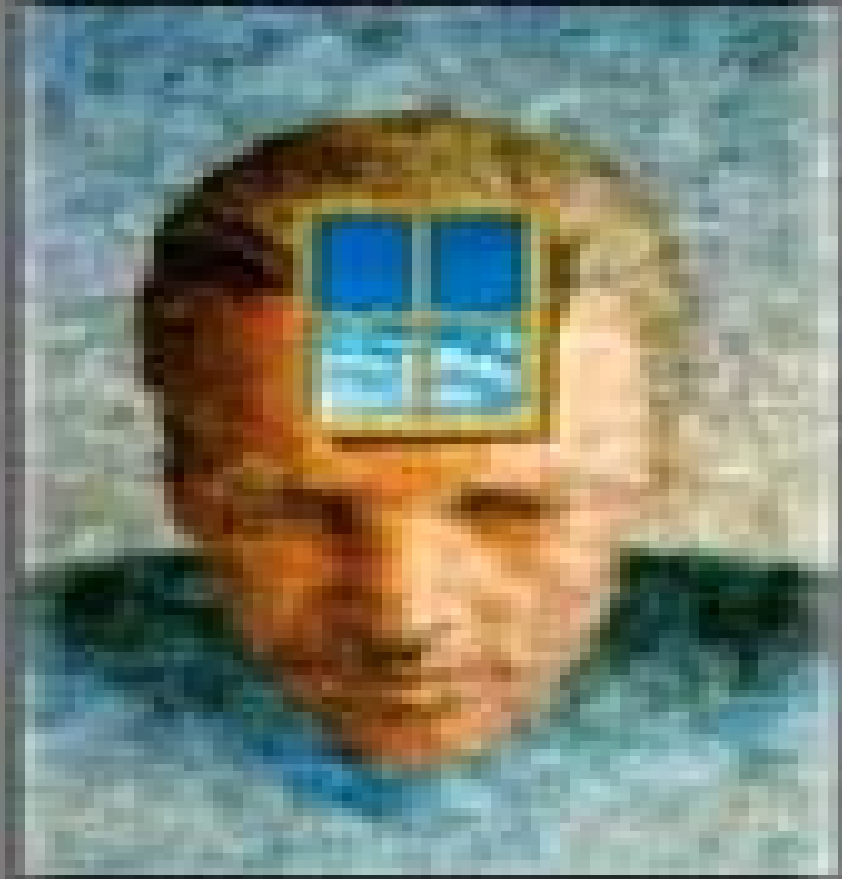
Georgian Society for
Psychophysiological Research



If there are no ups and downs in your life

It means you are dead

Brain ceases to function condition called brain death, the EEG become a flat line



EEG is the window of brain
We need to learn,
how to look and what to see



ORIGINAL RESEARCH article

Front. Neurol., 22 September 2021 | <https://doi.org/10.3389/fneur.2021.727297>

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EEG Characteristics to Hyperventilation by Age and Sex in Patients With Various Neurological Disorders

 Irma Khachidze^{1,2*},  Manana Gugushvili² and  Maia Advadze²



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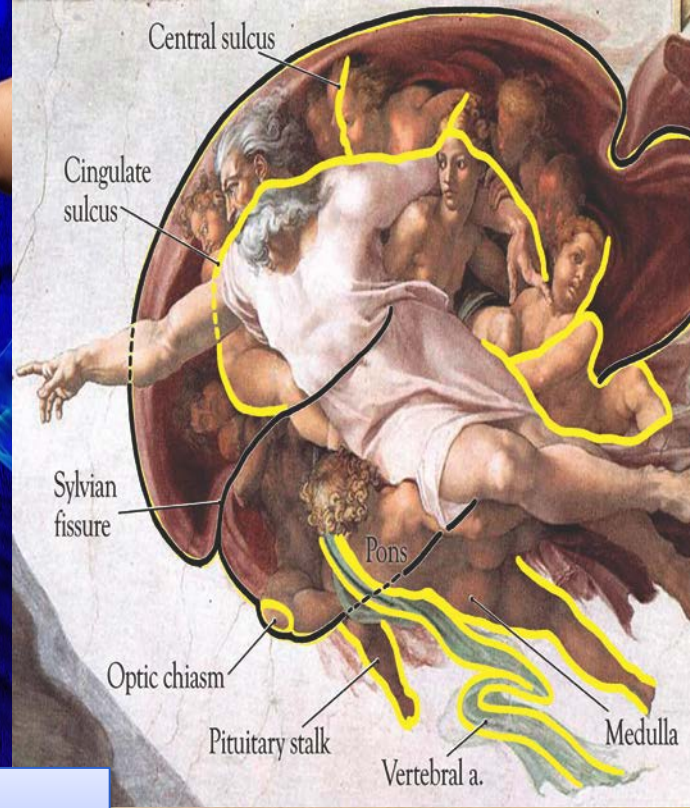
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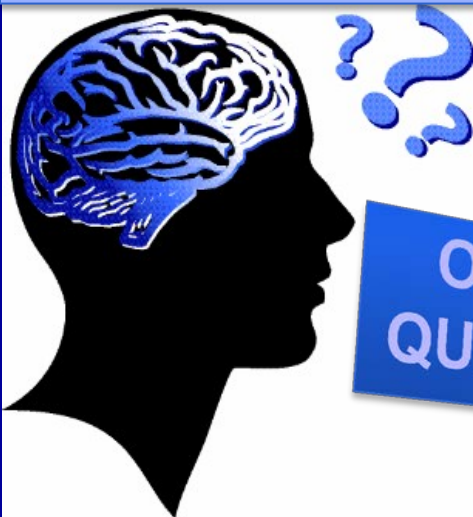
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Thank you for attention!



**OPEN FOR
QUESTIONS!**

Physical attractions
are common, but a mental,
intellectual, and spiritual
connections are rare.

idillionaire

