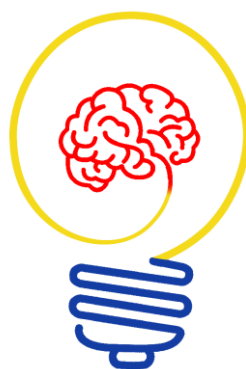




MINISTRY OF HEALTH OF RUSSIAN FEDERATION
SAMARA STATE MEDICAL UNIVERSITY
SAMARA REGION DEPARTMENT OF INFORMATION TECHNOLOGIES
SAMARA REGION INNOVATIVE CLUSTER OF MEDICAL TECHNOLOGIES
PRESIDENTIAL GRANTS FOUNDATION
NEURONET INDUSTRIAL UNION
HEALTHNET INFRASTRUCTURE CENTER
IT UNIVERSE LTD



THE 5TH INTERNATIONAL CONFERENCE BCI: SCIENCE AND PRACTICE. SAMARA 2019

and the satellite conference



VIRTUAL REALITY TECHNOLOGIES IN MEDICAL AND SOCIAL
REHABILITATION

AGENDA

Reports and papers of the **BCI: Science & Practice** conference are given in English or Russian and published in English. The working language of the satellite conference **Virtual reality technologies in medical and social rehabilitation** and the partner symposium **AI in healthcare and HealthNet roadmap: next steps** is Russian.

Scientific and satellite activities **on 3 - 4 October 2019 (9:00 - 18:00)** and on **5 October 2019 (9:00 - 14:00)** are held at the **7 Avenue hotel, 3 Novo-Sadovaya street, Samara, Russia**. The Neurothlon 2019 competition is organized at the **Expo-Volga Exhibition Center (23A Michurina Street, Samara)** on **October 5 from 4 p.m. to 7 p.m.**

Доклады и материалы конференции “**НКИ: Наука и практика**” читаются на английском или русском и издаются на английском языке. Рабочим языком конференции “**Технологии виртуальной реальности в медико-социальной реабилитации**” и партнерского мероприятия **Инфраструктурного центра Хелснет НТИ** является русский.

Все научные мероприятия и мероприятия-спутники **3 - 4 октября 2019 (9:00 - 18:00)** и **5 октября 2019 (9:00 - 14:00)** проходят в **отеле 7 Авеню** по адресу: г. Самара, ул. Ново-Садовая, 3. Соревнования “**Нейротлон 2019**” пройдут **5 октября с 16 до 19 часов** на площадке **ВЦ “Экспо-Волга” (ул. Мичурина, 23А)**.

Мероприятия, отмеченные в программе знаком **V**, относятся к конференции-спутнику “**Технологии виртуальной реальности в медико-социальной реабилитации**”, отмеченные знаком **&** - являются совместными мероприятиями двух конференций и Инфраструктурного центра Хелснет НТИ.

Симпозиум “**Искусственный интеллект в здравоохранении и дорожная карта Хелснет: что дальше?**” отмеченный знаком **+** является партнерским мероприятием Инфраструктурного центра Хелснет НТИ.

Thursday, 3 October

Plenary session. Moderators: Mikhail Lebedev and Fabien Lotte

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| 09:00 – 10:00 | Registration, welcome coffee. | Регистрация участников, кофе. |
| 10:00 – 10:05 | Greetings from the Ministry of Health of Russian Federation and the Government of Samara Region | Приветствия от Министерства здравоохранения РФ и Правительства Самарской области |
| 10:05 – 10:20 | Alexander Kolsanov (Head of SamSMU, Russia) 100th Anniversary of Samara State Medical University: its current state and development prospects | Александр Колсанов (ректор СамГМУ, Россия) Самарскому государственному медицинскому университету - 100 лет: его современное состояние и перспективы |
| 10:20 – 10:45 | Fabien Lotte (INRIA, France) Understanding, modeling and optimising Brain-computer Interface user training | Фабьен Лотте (INRIA, Франция) Понимание, моделирование и оптимизация обучения пользователей интерфейса мозг-компьютер |

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| 10:45 – 11:10 | Tomasz Rutkowski (RIKEN AIP/ University of Tokyo, Japan) Multisensory reactive and passive BCIs - applications for robotics, VR/AR and dementia diagnostics | Томаш Рутковски (RIKEN AIP/ Университет Токио, Япония) Мультисенсорные реактивные и пассивные ИМК: применение в робототехнике, управлении VR/AR и диагностике деменции |
| 11:10 – 11:25 | Coffee-break | Кофе-брейк |
| 11:25 – 11:50 | Sergei Shishkin (NRC Kurchatov Institute, Russia) Combining the eye gaze, EEG and MEG for creating new modes of human- computer interaction | Сергей Шишкин (НИЦ "Курчатовский институт", Россия) Совместное использование взгляда, ЭЭГ и МЭГ для создания новых возможностей в человеко-компьютерном взаимодействии |
| 11:50 – 12:15 | Surjo Soekadar (University of Tuebingen / Charité - University Medicine Berlin, Germany) Brain/Neural-Machine Interfaces (B/NMIs) for Restoration of Movement and Beyond | Сурьо Сокадар (Университет Тюбингена/ Шаритэ - Медицинский университет Берлина, Германия) ИМК/НКИ для восстановления движения, и не только. |
| 12:15 – 12:40 | Thorsten Zander (Berlin Institute of Technology, Germany) From direct control to neuroadaptivity: The use of Brain-Computer Interfaces for Human-Machine Systems | Торстен Цандер (Берлинский технологический институт, Германия) От прямого контроля к нейроадаптивности: использование ИМК для систем человек- машина |
| 12:40 – 13:05 | Vadim Nikulin (Max Planck Institute, Germany) Clinical and neurotechnological aspects of neural dynamics in EEG/MEG recordings | Вадим Никулин (Институт Макса Планка, Германия) Клинические и нейротехнологические аспекты нейрональной динамики в ЭЭГ/МЭГ |
| 13:05 – 14:05 | Lunch | Обед |
| & 14:05 – 15:20 | Poster reports session Opening of an exhibition of neurotech and VR systems (the exhibition is open on 3 and 4 October) | Сессия постерных докладов Открытие экспозиции устройств на базе нейротехнологий и ВР (экспозиция работает 3 и 4 октября). |
| 15:20 – 15:45 | Alexander Kaplan (MSU, Russia) Brain-computer interface technology: pragmatic and philosophical aspects | Александр Каплан (МГУ, Россия) Технология интерфейсов мозг-компьютер: прагматические и философские аспекты |

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| 15:45 – 16:10 | Alexey Ossadtchi (NRU HSE, Russia) The first Russian invasive bidirectional BCI project: progress report | Алексей Осадчий (НИУ ВШЭ, Россия) Первый российский двунаправленный интерфейс мозг-компьютер: отчет о ходе проекта |
| 16:10 – 16:35 | Lee Miller (Northwestern University, USA) Development of a continuously active, wireless brain machine interface to restore voluntary movement following spinal cord injury | Ли Миллер (Северо-Западный университет, США) Создание постоянно действующего беспроводного ИМК для восстановления произвольного движения после повреждения позвоночника |
| 16:35 – 16:50 | Coffee break | Кофе-брейк |
| 16:50 – 17:15 | Tonio Ball (University of Freiburg, Germany) Deep Learning for Brain Signals: Performance and Interpretability | Тонио Балл (Университет Фрайбурга, Германия) Глубинное обучение для изучения сигналов мозга: производительность и интерпретируемость |
| 17:15 – 17:40 | Maxim Sharaev, Andrzej Cichocki (Scholtech, Russia and RIKEN AIP, Japan) Tensor Factorizations and Tensor Networks and their Applications in Brain Computer Interface, Recognition of Human Emotions and Early Detections of some Mental Diseases | Максим Шараев, Анджей Чихоцки (Сколтех, Россия и RIKEN AIP, Япония) Тензорная факторизация, тензорные сети и их применение в ИМК, распознавании человеческих эмоций и раннем обнаружении некоторых психических заболеваний |
| 17:40 - 18:05 | Mikhail Lebedev (NRU HSE, Russia and Duke University, USA) Brain-computer interfaces for extracting multiple motor, attentional and motivational signals from cortical activity | Михаил Лебедев (НИУ ВШЭ, Россия и Университет Дьюка, США) Нейроинтерфейсы для декодирования моторных команд, внимания и мотивации по кортикальной активности |
| & 18:05 – 18:30 | Networking time and poster reports session | Время для общения и постерная сессия |
| 18:30 – 19:00 | Free time | Свободное время |
| 19:00 - 23:00 | Gala-dinner | Гала-ужин |

Friday, 4 October

| Parallel section tracks in the Hall 1 and Hall 2 | | |
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| & 09:00 – 11:00 | Excursions to SSMU’s Technopark and Advanced studies center OR city center tour. | Экскурсионная программа: посещение Технопарка и ЦПИ СамГМУ ИЛИ тур по историческому центру города. |
| 09:00 – 11:00 | <i>Hall 1</i> Symposium Hi-tech prosthetic and assistive technologies: vision, hearing, touch, limbs, exoskeletons... <i>Directed by Denis Kuleshov</i> | <i>Зал 1</i> Симпозиум “Высокотехнологичное протезирование и ассистивные технологии: зрение, слух, осязание, конечности, экзоскелеты...” <i>Ведущий - Денис Кулешов</i> |
| V 09:00 – 11:00 | <i>Hall 2</i> Symposium VR technologies in medical and social rehabilitation (in Russian) <i>Directed by Yan Vlasov</i> | <i>Зал 2</i> Симпозиум “Технологии виртуальной реальности в медико-социальной реабилитации” (на русском языке) <i>Ведущий: Ян Власов</i> |
| & 11:00 – 12:45 | <i>Hall 1</i> Panel discussion AI, BM\BCI and VR/AR technologies in day-to-day life and healthcare: what is real and what is probably not? <i>Moderator: Tomasz Rutkowski</i> <i>Speakers:</i> Tonio Ball Fabien Lotte Lee Miller Vadim Nikulin Yannick Roy Thorsten Zander | <i>Зал 1</i> Панельная дискуссия “Технологии ИИ, ИМК\НКИ и ВР в повседневной жизни и здравоохранении: что реально, а что не очень?” <i>Модератор: Томаш Рутковски</i> <i>Участники:</i> Тонио Балл Фабьен Лотте Ли Миллер Вадим Никулин Янник Руа Торстен Цандер |
| 11:00 – 12:45 | <i>Hall 2</i> Workshop Transcranial magnetic stimulation: principles, possibilities, limitations (in Russian) <i>Directed by Maria Nazarova (NRU HSE), supported by Infomed Ltd.</i> | <i>Зал 2</i> Воркшоп “Транскраниальная магнитная стимуляция: принципы, возможности, ограничения” (на русском языке) <i>Ведущая Мария Назарова (НИУ ВШЭ), при поддержке компании “Инфомед”.</i> |
| 12:45 – 14:00 | Lunch and Poster reports session | Обед и постерная сессия |

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| <p>& 14:00 – 15:30</p> | <p><i>Hall 1</i> Symposium State-of-the art neurotechnologies in real healthcare and rehabilitation <i>Directed by Surjo Soekadar</i></p> | <p><i>Зал 1</i> Симпозиум “Современные нейротехнологии в практической медицине и реабилитации” <i>Ведущий - Сурьо Сокадар</i></p> |
| <p>+ 14:00 – 15:30</p> | <p><i>Hall 2</i> Symposium AI in healthcare and HealthNet roadmap: next steps (in Russian) <i>Directed by Maria Galyamova</i></p> | <p><i>Зал 2</i> Симпозиум “Искусственный интеллект в здравоохранении и дорожная карта Хелснет: что дальше?” (на русском языке) <i>Ведущая - Мария Галямова</i></p> |
| <p>15:30 – 15:45</p> | <p>Coffee-break</p> | <p>Кофе-брейк</p> |
| <p>15:45 – 18:00</p> | <p><i>Hall 1</i> Symposium Machine Learning and Deep Neural Networks in Neurophysiology and Healthcare <i>Directed by Tonio Ball</i></p> | <p><i>Зал 1</i> Симпозиум “Машинное обучение и глубокие нейронные сети в нейрофизиологии и медицине” <i>Ведущий – Тонио Балл</i></p> |
| <p>15:45 – 18:00</p> | <p><i>Hall 2</i> Workshop EEG acquisition by various types of wet, dry and hybrid amplifiers. Alternative neuroimaging and neuromodulation methods: NIRS and tES. <i>Directed by Stanislav Zabodaev (MKS Ltd, Russia) and Johannes Gruenwald (gtec, Austria)</i></p> | <p><i>Зал 2</i> Воркшоп “Запись ЭЭГ различными типами “мокрых”, “сухих” и гибридных устройств. Альтернативные методы нейровизуализации и нейромодуляции: БИК-спектрометрия и ТЭС-терапия” <i>Ведущие - Станислав Забодаев (МКС, Россия) и Йоханнес Грюнвальд (gtec, Австрия)</i></p> |
| <p>18:00 – 18:30</p> | <p>Free time</p> | <p>Свободное время</p> |
| <p>18:30</p> | <p>Transfer</p> | <p>Трансфер</p> |
| <p>& 19:15 – 19:30</p> | <p>Best poster reports award ceremony</p> | <p>Награждение победителей постерной сессии</p> |
| <p>19:30 – 22:00</p> | <p>Premier show of Brain.Evolution documentary, autograph session</p> | <p>Премьерный показ фильма Мозг. Эволюция. Встреча с героями фильма</p> |

Saturday, 5 October
Satellite events, open for general public

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| <p style="text-align: center;">&</p> <p>09:00 – 10:30</p> | <p><i>Hall 1</i></p> <p>Master class How to design your scientific presentation or poster (in Russian)</p> <p><i>Directed by Anna Khoruzhaya</i></p> | <p>Зал 1</p> <p>Мастер-класс “Оформление научных презентаций и постерных докладов” (на русском языке)</p> <p><i>Ведущая - Анна Хоружая</i></p> |
| <p style="text-align: center;">V</p> <p>09:00 – 10:30</p> | <p><i>Hall 2</i></p> <p>Workshop for journalists and press-officers How we can write about science and modern technologies such as AI, BCI, VR etc (in Russian)</p> <p><i>Directed by Alexei Paevskiy</i></p> | <p>Зал 2</p> <p>Воркшоп для журналистов и сотрудников пресс-служб “Как можно писать о науке и современных технологиях - ИИ, НКИ, ВР и других” (на русском языке)</p> <p><i>Ведущий - Алексей Паевский</i></p> |
| <p>10:30 – 12:00</p> | <p><i>Hall 1</i></p> <p>Consumer EEG Devices and Democratization of Neurotechnology - a lecture and equipment demonstration</p> <p>Presentation of NeuroTechX international community</p> <p><i>Directed by Yannick Roy</i></p> | <p>Зал 1</p> <p>Лекция и демонстрация оборудования “Потребительские ЭЭГ устройства и демократизация нейротехнологий”</p> <p>Презентация международного сообщества NeuroTechX</p> <p><i>Ведущий - Янник Руа</i></p> |
| <p style="text-align: center;">V</p> <p>10:30 – 12:00</p> | <p><i>Hall 2</i></p> <p>Workshop Use of ReviVR and ReviMotion simulators in rehabilitation of patients with neurological pathologies (in Russian)</p> <p><i>Directed by Aleksander Zakharov</i></p> | <p>Зал 2</p> <p>Мастер-класс Использование тренажеров ReviVR и ReviMotion в реабилитации пациентов с патологиями неврологического профиля (на русском языке)</p> <p><i>Ведущий - Александр Захаров</i></p> |
| <p style="text-align: center;">&</p> <p>12:15 – 14:15</p> | <p><i>Hall 1</i></p> <p>Scientific-popular lectures, co-organized with Think, Samara! group</p> <p>Alexei Paevskiy BCI Stone Age: what works predetermined the appearance of the brain-computer interfaces</p> <p>Alexander Kaplan Augmented brain: fantasies and realities, possibilities and meanings</p> | <p>Зал 1</p> <p>Научно-популярные лекции, совместно с группой “Думай, Самара!”</p> <p>Алексей Паевский "Каменный век BCI: какие работы предопределили появление интерфейсов "Мозг-компьютер"</p> <p>Александр Каплан Мозг дополненный: фантазии и реалии, возможности и смыслы</p> |

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| | <p>Fabien Lotte Why and How to train to control a Brain-Computer Interfaces?</p> <p>Lee Miller Awakening Paralyzed Limbs with a Brain Machine Interface</p> <p>Tomasz Rutkowski Neurotechnology for dementia</p> <p>Surjo Soekadar What's next in neurotech? Brain-Computer Interfaces in 2030</p> | <p>Фабьен Лотте Как и зачем можно научиться управлять нейрокомпьютерным интерфейсом?</p> <p>Ли Миллер “Пробуждение” парализованных конечностей с помощью НКИ</p> <p>Томаш Рутковски Нейротехнологии против деменции</p> <p>Сурьо Сокадар Нейротехнологии: что дальше? НКИ в 2030</p> |
| 16:00 – 19:00 | <p>(at the Expo-Volga exhibition Center, 23A Michurina street)</p> <p>Competition for people with disabilities using assistive technology organized by NeuroNet Industrial Union and supported by the Department of Information Technologies of Samara Region</p> <p>Neurothlon 2019</p> | <p>(на площадке ВЦ Экспо-Волга, ул. Мичурина 23А)</p> <p>Соревнования людей с ограниченными возможностями, использующих ассистивные технологии, организованные Отраслевым Союзом Нейронет при поддержке Департамента информационных технологий Самарской области</p> <p>Нейротлон 2019</p> |

Exhibition Area

Open 3 October 14:30 - 18:30 and 4 October 10:00 - 18:30

| No | Exhibitor | Products information |
|----|------------------------------------|---|
| 1 | MKS Ltd (Moscow) | Devices and accessories for EEG acquisition and electrical stimulation. NIRS and tES equipment. |
| 2 | gtec (Graz, Austria) | Portable wireless EEG devices with dry and wet electrodes |
| 3 | Infomed Ltd (Moscow) | Transcranial magnetic stimulation equipment |
| 4 | IT Universe Ltd (Samara - Toronto) | VIBRAINT RehUp: BCI-based upper limb motor rehabilitation system |
| 5 | IT Universe Ltd (Samara - Toronto) | VIBRAINT Assist: BCI-based electronic help for paralyzed |
| 6 | GSS Ltd (Samara) | Keller HG: haptic glove for deaf-blind |

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| 7 | SamSMU (Samara) | ReviVR: VR-based lower limb motor rehabilitation system |
| 8 | SamSMU (Samara) | ReviMotion: VR-based gait rehabilitation system |
| 9 | NeuroTrend Ltd (Moscow) | An EEG and eye-tracking equipment |

The conference **BCI:Science & Practice. Samara 2019** is supported by the Department of Information Technology of the Samara Region and the Neuronet Industry Union

The conference **Virtual reality technologies in medical and social rehabilitation** is held at the expense of a grant from the President of the Russian Federation on the development of civil society provided by the Presidential Grants Foundation.

The Symposium **Artificial Intelligence in Healthcare and the Healthnet roadmap: What's Next?** is a partnership event of the Infrastructure Center of the Healthnet Roadmap.

Конференция **НКИ: Наука и практика** проводится при поддержке Департамента информационных технологий Самарской области и Отраслевого союза “Нейронет”

Конференция **“Технологии виртуальной реальности в медико-социальной реабилитации”** проводится за счет средств гранта Президента Российской Федерации на развитие гражданского общества, предоставленного Фондом президентских грантов.

Симпозиум **“Искусственный интеллект в здравоохранении и дорожная карта Хелснет: что дальше?”** является партнерским мероприятием Инфраструктурного центра дорожной карты Хелснет.

APPENDIX

Symposiums and poster reports detailed program

Symposium
State-of-the art neurotechnologies in real healthcare, rehabilitation and prosthetics
 directed by Surjo Soekadar

| № | Authors and Affiliation | Report Title |
|---|---|---|
| 1 | Olga Bazanova ¹ , Elena Sapina ² ¹ Laboratory of Affective, Cognitive and Translational Neuroscience, Federal State Research Institute of Physiology and Basic Medicine, Novosibirsk; ² Laboratory of Biofeedback Computer System, Research Institute of Molecular Biology and Biophysics, Novosibirsk | Individualized Neurofeedback training reduces Theta/Beta more efficiently than standard, non-individualized |
| 2 | Aleksei Tummyalis, Artur Biktimirov Medical Centre, Far Eastern State University, Vladivostok | Modern neuromodulation and feedback systems: practical solutions |
| 3 | Pavel Bobrov ^{1,2} , Alexander Frolov ^{1,2} , Guzel Aziatskaya ³ , Elena Biryukova ^{1,2} , Yulia Bushkova ² , Anna Kondur ⁴ , Roman Lyukmanov ³ , Lidiya Turbina ⁴ , Sergei Kotov ⁴ ¹ Institute of Higher Nervous Activity and Neurophysiology, RAS, Moscow; ² Pirogov Russian National Research Medical University, Moscow; ³ Research Center of Neurology RAS, Moscow; ⁴ M.F. Vladimirsky Moscow Regional Research and Clinical Institute, Moscow | The results of BCI-controlled Exoskeleton clinical trials: rehabilitation outcome and EEG analysis |
| 4 | Pavel Novikov ¹ , Maria Nazarova ^{1,2} , Kseniya Kozlova ¹ , Ekaterina Ivanina ³ , Vadim Nikulin ^{1,4,5} ¹ Centre for Cognition and Decision Making, Institute for Cognitive Neuroscience, National Research | TMSmap software for quantitative analysis of TMS mapping results - demonstration of the new features |

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| | <p>University Higher School of Economics, Moscow; ² Federal Center for Cerebrovascular Pathology and Stroke, The Ministry of Healthcare of the Russian Federation, Federal State Budget Institution, Moscow; ³ Department of Psychology, National Research University Higher School of Economics, Moscow; ⁴ Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; ⁵ Neurophysics Group, Department of Neurology, Campus Benjamin Franklin, Charité—Universitätsmedizin Berlin, Berlin, Germany</p> | |
| 5 | <p>Morgane Rosendale¹, Fabien Lotte²</p> <p>¹ Univ. Bordeaux; ² Inria Bordeaux Sud-Ouest / LaBRI (Univ. Bordeaux / CNRS / Bordeaux INP)</p> | Using light to monitor brain activity from the macro- to the nanoscale |
| 6 | <p>Mikhail Sinkin^{1,2}, Alexei Ossadtchi³</p> <p>¹ N.V. Sklifosovsky Research Institute for Emergency Medicine, Moscow; ² A.I. Evdokimov Moscow State University of Medicine and Dentistry, Moscow; ³ National Research University Higher School of Economics, Moscow</p> | Invasive and non-invasive brain mapping in clinical practice. |
| 7 | <p>Ksenia Volkova, Alexei Ossadtchi, Alexander Belyaev, Mikhail Lebedev</p> <p>Center for Bioelectric Interfaces, National Research University Higher School of Economics, Moscow</p> | Decoding movement direction from ECoG for the instructed-delay center-out task performed with a pen |
| 8 | <p>Alexander Zakharov, Elena Khivintseva, Vasiliy Pyatin, Alexander Kolsanov, Maria Sergeeva</p> <p>Samara State Medical University</p> | Preliminary results of the research of efficiency of the technique of virtual reality for restoration of motor function of the lower extremities at patients in acute stroke |

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| 9 | <p>Zhanna Nagornova^{1,2}, Philip Gundelakh^{2,3}, Konstantin Sonkin², Lev Stankievich^{2,3}, Natalia Shemyakina^{1,2}</p> <p>¹ Sechenov Institute of evolutionary physiology and biochemistry, Russian Academy of Sciences, St. Petersburg; ² LLC "I-Brain", St. Petersburg; ³ Peter the Great St. Petersburg Polytechnic University, St. Petersburg</p> | Neurophysiological effects of a motor training with game feedback based on Brain-Computer Interface "i-BrainTech" |
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Symposium
Hi-tech prosthetic and assistive technologies: vision, hearing, touch, limbs, exoskeletons...
 directed by Denis Kuleshov

| № | Authors and Affiliation | Report Title |
|---|---|--|
| 1 | Vladimir Konyshv Neurobotics | What sensory organs can be transferred from a robot to a person? |
| 2 | Andrey Demchinsky Sensor - Tech Lab | Present and future of bionic eye prostheses |
| 3 | Anton Machalov Scientific and clinical center of otorhinolaryngology of Federal Biomedical Agency | Present and future of cochlear implants |
| 4 | Tatiana Vladimirova SamSMU | Rehabilitation of patients with hearing aids and cochlear implants using virtual reality systems |
| 5 | Elizaveta Okorokova Bensmaia Lab, University of Chicago | Prosthetics you can feel |
| 6 | Anton Sobinov Department of Neuroscience, School of Medicine, West Virginia University, Morgantown, West Virginia, USA | Biomorphic approach to the control of myoelectric prostheses |

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| 7 | Eugeny Dudorov Android Technics | Robotics in modern healthcare |
| 8 | Ekaterina Berezyi Exoatlet | TBA |

Symposium
Machine Learning and Deep Neural Networks in Healthcare and Neurophysiology
directed by Tonio Ball

| № | Authors and Affiliation | Report Title |
|---|--|--|
| 1 | Kate Kondrateva, Marina Pominova, Vyacheslav Yarkin, Maksim Sharaev, Alexander Bernstein, Evgeny Burnaev Skoltech, Moscow | Psychoneurological disorders diagnostics based on MRI / fMRI |
| 2 | Johannes Gruenwald ^{1,2} , Christoph Kapeller ¹ , Kyouusuke Kamada ³ , Josef Scharinger ² , Christoph Guger ¹ ¹ g.tec medical engineering GmbH, Schiedlberg, Austria; ² Institute of Computational Perception, Johannes Kepler University, Linz, Austria; ³ Hokashin Group Megumino Hospital, Sapporo, Japan | Optimal High-Gamma Bandpower Estimation and Denoising for Invasive Brain-Computer Interfaces |
| 3 | Dmitrii Altukhov ¹ , Evgenii Kalenkovich ¹ , Andrey Zhukov ² , Nikolai Smetanin ² , Alexei Ossadtchi ² ¹ Centre for Neuroeconomics and Decision Making, NRU Higher School of Economics, Moscow; ² Centre for Bioelectric Interfaces, NRU Higher School of Economics, Moscow | Cognigraph: a real-time EEG-based source imaging software |
| 4 | Bogdan Kozyrsky NRC Kurchatov Institute, Moscow | Considering the classifier variance in Bayesian hyperparameter optimization |

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| 5 | <p>Ilya Mikheev¹, V.Zemlyak¹, I.Dybushkin², A. Lebedev¹, Alexei Ossadtchi¹</p> <p>¹ National Research University Higher School of Economics, Moscow; ² Lomonosov Moscow State University, Moscow</p> | Is subcortical fMRI only machine learning away from scalp EEG? |
| 6 | <p>Yannick Roy</p> <p>Faubert Lab, University of Montréal, Canada</p> | Current trends in deep learning for EEG analysis and how to improve reproducibility of DL-EEG studies |
| 7 | <p>Ivan Zubarev</p> <p>Department of Neuroscience and Biomedical Engineering, Aalto University, Espoo, Finland</p> | MNEflow: open-source academic software for applying neural networks to electromagnetic brain measurements and brain-computer interfacing |
| 8 | <p>Alexey Korobkov¹, Kristina Naskovska², Martin Haardt², Jens Haueisen³</p> <p>¹ Department of Radioelectronic and Telecommunication Systems, Kazan Technical University n.a. A.N Tupolev-KAI; ² Communications Research Laboratory, Ilmenau University of Technology, Ilmenau, Germany; ³ Institute of Biomedical Engineering and Informatics, Ilmenau University of Technology, Ilmenau, Germany</p> | Joint processing of the signals from brain based on tensor algebra |
| 9 | <p>Maksim Sharaev, Alexey Artermov, Evgeny Burnaev, Alexander Bernstein</p> <p>Skoltech, Moscow</p> | Neuroimaging data analysis for biomedical problems |

**Poster reports of the conference
BCI:Science & Practice. Samara 2019**

Posters will be displayed in the main conference halls.
Poster sessions are scheduled at:
3 October - 14:05 -15:20 and 18:05 - 18:30
4 October - 12:45-14:00 (during lunchtime)

| № | Authors and Affiliation | Report Title |
|---|--|--|
| 1 | Anastasiia Belinskaia, Nikolai Smetanin, Alexei Ossadtchi Centre for Bioelectric Interfaces, National Research University Higher School of Economics, Moscow | The Effect of Feedback Signal Presentation Latency on the Effectiveness of Training in Neurofeedback Paradigm |
| 2 | Valentina Bulgakova, Alexei Ossadtchi Centre for Bioelectric Interfaces, Higher School of Economics, Moscow | ECOG based inverse modelling for decoding and eloquent cortex mapping |
| 3 | D. A. Buyanov Medical Computer Systems Ltd., Zelenograd, National Research University of Electronic Technology (MIET), Zelenograd | Development of a hardware-software system for performance testing with non-invasive control of the lactate threshold |
| 4 | Kirill Fadeev ¹ , Alex Tumialis ¹ , Kirill Golokhvast ¹ , Artur Biktimirov ² ¹ Laboratory of educational psychophysiology, Far Eastern State University, Vladivostok; ² Medical Centre, Far Eastern State University, Vladivostok | Patient's motion capture when performing UPDRS for an objective diagnosis of motor disorders in Parkinson disease |
| 5 | A.I. Fedotchev ¹ , S.A.Polevaia ² , S.B. Parin ³ ¹ Institute of Cell Biophysics, Russian Academy of Sciences, Moscow Region; ² Privolzhskiy Research Medical University, Nizhny Novgorod; ³ Lobachevsky State University of Nizhny Novgorod | Neurofeedback for correction of stress-induced states |

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| 6 | <p>Natalia Galkina¹, Alexander Luzhin², Alexander Kaplan³</p> <p>¹ NeuroChat Ltd, Moscow;² NeuroTrend, Moscow, ³ Lomonosov Moscow State University, Moscow</p> | NeuroChat approbation results |
| 7 | <p>Yakov Furman¹, Viktor Sevastyanov^{1, 2}, Konstantin Ivanov¹</p> <p>¹ Volga State University of Technology, Yoshkar-Ola; ² Center of Speech Pathology and Neuro Rehabilitation, Yoshkar-Ola</p> | EEG signal analysis from the standpoint of the structural approach |
| 8 | <p>Ekaterina Ivanina¹, Anastasia Asmolova¹, Michael Ivanov¹, Novikov Pavel², Vadim Nikulin^{2,3,5}, Maria Nazarova^{2,6}</p> <p>¹ Department of psychology, Higher School of Economics, Moscow; ² Center for Cognition and Decision Making, Institute for Cognitive Neuroscience, National Research University Higher School of Economics, Moscow; ³ Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; ⁴ Neurophysics Group, Department of Neurology, Campus Benjamin Franklin, Charité-Universitätsmedizin Berlin, Berlin, Germany; ⁵ Bernstein Center for Computational Neuroscience, Berlin, Germany; ⁶ Federal State Budget Institution Federal Center for Cerebrovascular Pathology and Stroke, Moscow</p> | Somatotopy of Excitation and Inhibition Probed by pp TMS – preliminary results |
| 10 | <p>Maria Kim¹, Victoria Panchenko¹, Maria Sergeeva¹, Vladimir Bulanov², VasilyPyatin¹</p> <p>¹ Samara State Medical University, Samara; ² IT Universe Ltd, Samara</p> | EEG classification of motor imagery using convolutional neural network |
| 11 | <p>Luiza Kirasirova, Vasily Pyatin</p> <p>Samara State Medical University, Samara</p> | Neurophysiological mechanisms of emotional-cognitive interaction with BCI - P300 |

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| 12 | Sergey Kravchenko Kuban State Medical University, Krasnodar | Modular artificial neural network for neuroscience education |
| 13 | Aleksandra Kuznetsova, Alexei Ossadtchi Centre for Bioelectric Interfaces, NRU Higher School of Economics, Moscow | MEG based functional microscopy using traveling wave priors: a new technology for exploring epilepsy |
| 14 | Morenova K.A., Vedyasova O.A. Samara National Research University | Changes in the spectral power of EEG in right-handers and left-handers in the process of legs movements imagination |
| 15 | Uliana Nasonova ¹ , Valeria Katunova ¹ , Anastasia Sukhanova ² ¹ Privolzhsky Research Medical University, Nizhnij Novgorod; ² Lobachevsky State University of Nizhny Novgorod | The use of postural balance for the rehabilitation of children with ADHD |
| 16 | Julia Nekrasova Moscow Aviation Institute (National Research University), Moscow | Comparison of Classification Algorithms for EEG- Based Motor Imagery BCI |
| 17 | Vitaliy Petrov, Stepan Botman, Viktor Sapunov, Vladimir Savinov, Natalia Shusharina School of Life Sciences Immanuel Kant Baltic Federal University, Kaliningrad | EMG based finger bending tracking for VR applications |
| 18 | Anna Shishkina, Nikolay Smetanin, Alexey Ossadtchi NRU Higher School of Economics, Moscow | Software Platform for MEG-Based Neurofeedback Training |
| 19 | Nikolai Smetanin, Aleksandra Kuznetsova, Marina Ivanova, Alexey Ossadtchi Centre for Bioelectric Interfaces, HSE, Moscow | Foot motor imagery triggered locomotion in exoskeleton: first results with paraplegic patients |

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| 20 | Anastasia Sudareva, Yulia Nekrasova Moscow State Aviation Institute | Hardware-Software Complex of the Mobile Brain-Computer Interface for Technical Means of Rehabilitation |
| 21 | Boris Vladimirskiy, Valeriy Kirov Center for Neurotechnology, Southern Federal University, Rostov-on-Don | Brain-computer Interface and Artificial Intelligence: Path to Convergence |
| 22 | Darisy Zhao, Anatoly Vasilyev, Bogdan Kozyrsky, Eugeny Melnichuk, Sergei Shishkin NRC "Kurchatov Institute", Moscow | EEG-based classification of the intentional and spontaneous selection of moving objects with gaze |

Symposium
AI in healthcare and HealthNet roadmap: next steps
in Russian, directed by Maria Galyamova

| № | Authors and Affiliation | Report Title |
|---|--|--|
| 1 | Maria Galyamova, IC HealthNet | HealthNet Roadmap |
| 2 | Oksana Fomicheva The Ministry of Health of the Russian Federation | The Development of Artificial Intelligence in Russian Federation |
| 3 | Vladimir Egorov, Skolkovo Foundation | The Support for AI Projects in Skolkovo Medicine |
| 4 | Maria Valeeva Agency for Strategic Initiatives | Networking Project for the Development of Competencies and Promotion of Technologies in the Area of AI |
| 5 | Anna Bondar Neuronet-Novosibirsk | The Role of Communities in Scientific Research: active Data accumulation |
| 6 | Philipp Khaitovich Skoltech | Identification of Perspective Biomarkers of Brain Functionality using Biochemical Data |

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| 7 | Dmitrii Ovchinnikov Skolkovo Foundation | AI-based Research in Pharmacy: Balance of Ethics and Progress |
| 8 | Ruslan Permyakov Academpark | Privacy and Artificial Intelligence in Healthcare: Problems and Challenges |

Symposium
VR technologies in medical and social rehabilitation
in Russian, directed by Yan Vlasov

| № | Authors and Affiliation | Report Title |
|---|---|--|
| 1 | Yan Vlasov SamSMU | Virtual technologies in the rehabilitation of patients with multiple sclerosis and the role of a patient community in health system development |
| 2 | Andrey Demchinsky Sensor-Tech Lab | Ophthalmic VR simulator SeeMyWorld. Experience and prospects of use |
| 3 | Aleksander Zakharov Samara Regional hospital n.a. V.Seredavin, SamSMU | Prospects for the use of VR in rehabilitation |
| 4 | Aleksander Voronin SamSMU | Experience of the use of VR in the rehabilitation of patients with multiple sclerosis. |
| 5 | Sergei Rovnov SamSMU | Development of interactive interactions with objects in virtual reality for social rehabilitation of patients with neurological pathologies |
| 6 | Ksenia Moiseeva SamSMU | The technique of evoked potentials in the diagnosis of cognitive impairment in patients with multiple sclerosis |
| 7 | Aleksander Lyakhov SamSMU | The results of a clinical study evaluating the effectiveness of virtual reality in the rehabilitation of patients in the acute period of ischemic stroke |
| 8 | Svyatoslav Natalevich SamSMU | Using virtual reality to correct walking disorders in Parkinson's disease |

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