

## World Water Day

Water Day is an annual event that looks at the global issues surrounding access to clean, safe drinking water and sanitation. This year's *Water Day* is focusing on the link between water and climate change, and how the two are linked. The UN has said, "Adapting to the water effects of climate change will protect health and save lives." Water is such a precious commodity that many take for granted. *World Water Day* is a chance to think about those people and places where water needs are still 'paramount,' and seek to work together to find a 'solution.'

## #BREAKTHROUGH

# Brain Stimulation Therapies

This technique can increase or decrease brain activity, but is most powerful when it targets specific brain functions that affect behaviours. This way, long-term memory as well as learning can be improved. The long-term goal is to use this technique in the treatment of psychiatric and neurological disorders.



For the first time, researchers show how the brain can precisely 'adapt to external stimulation.' Those at the University of Minnesota showed that non-invasive brain stimulation can change a specific 'brain mechanism' that is directly related to human behaviour. This is a major step forward for discovering new therapies to treat brain disorders such as schizophrenia, depression, Alzheimer's disease, and Parkinson's disease. The study was recently published in *Nature Communications*, a peer-reviewed, open access, scientific journal.



Researchers used what is called 'Transcranial Alternating Current Stimulation' to modulate brain activity. This technique is also known as 'Neuromodulation.' By applying a small electrical current to the brain, the timing of 'when brain cells are active' is shifted. This modulation of neural timing is related to neuroplasticity, which is a change in the connections between brain cells, that is needed for human behaviour, learning, and cognition.

"Previous research showed that brain activity was time-locked to stimulation. What we found in this new study is that this relationship slowly changed and the brain adapted over time as we added in external stimulation," said Alexander Opitz, University of Minnesota Biomedical Engineering associate professor. "This showed brain activity shifting in a way we didn't expect."

This result is called 'neural phase precession.' This is when the brain activity gradually changes over time in relation to a repeating pattern, like an external event or in this case non-invasive stimulation. In this research, all three investigated methods (computational models, humans, and animals) showed that the external stimulation could shift brain activity over time.

The timing of this repeating pattern has a direct impact on brain processes, for example, how we navigate space, learn, and remember," Opitz said. The discovery of this new technique shows how the brain adapts to external stimulation. "This

technique can increase or decrease brain activity, but is most powerful when it targets specific brain functions that affect behaviours. This way, long-term memory as well as learning can be improved. The long-term goal is to use this technique in the treatment of psychiatric and neurological disorders.

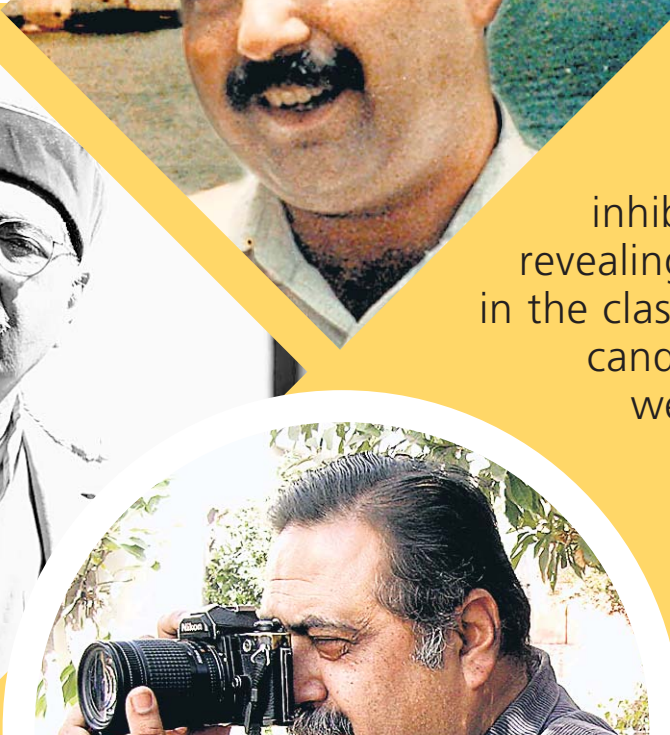
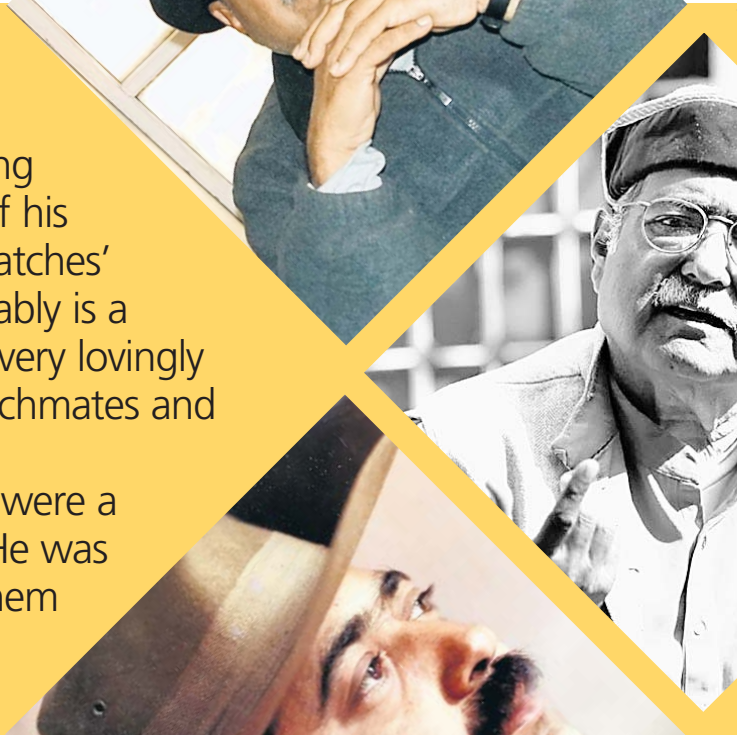
Opitz hopes that this discovery will help bring improved knowledge and technology to clinical applications, which could lead to more personalized therapies for schizophrenia, depression, Alzheimer's disease, and Parkinson's disease.

In addition to Opitz, the research team included co-first authors Miles Wischniewski and Harry Tran. Other team members from the University of Minnesota Biomedical Engineering Department include Zhihe Zhao, Zachary Haigh, Nipun Perera, Ivan Alekseiuk, Sina Shirinpour and Jonna Rottevel. This study was in collaboration with Dr. Jan Zimmermann, associate professor in the University of Minnesota Medical School.

This work was supported primarily by the National Institute of Health (NIH), along with the Brain and Behaviour Research Foundation and the University of Minnesota's Discovery, Research, and InnoVation Economy (MnDRIVE) initiative. Computational resources were provided by the Minnesota Supercomputing Institute (MSI).



He selflessly spent the five-six months in his last year of life, when he was not well, compiling and producing the '*directory*' of his batchmates of school for the batches' golden jubilee. '*Directory*' probably is a misnomer. It was a pensketch, very lovingly written, about his sixty odd batchmates and supplemented by old and new photographs. The pensketches were a stroll down the memory lane. He was so disarming while talking to them that they bared their soul like never before or ever since.



One such friend's self-confession was from a batchmate, who shedding all inhibitions, asked in one of these revealing chats, "Why does everyone in the class dislike me so much?" Nihal candidly answered, "Because you were too good, best and stood shoulders above us all, mundane people like me, whether it be science, humanities or sports, you made us look so small and ordinary."



# The fragrance of Nihal



Rajesh Sharma  
Writing for ARBIT

Nihal was a classmate and a friend of my younger brother, Rakesh. Rakesh's friends followed the old *Rajasthani* tradition which probably had its roots in the *Rajput culture* of the younger brother's friends, being very respectful to the friend's *Bhai Sahib* but at the same time always maintaining a formal distance.

But Nihal was different, right from the beginning, from the other friends of Rakesh. Being humorous and witty, he had a huge repertoire



of stories to tell, rendered with a twinkle in the eye but venom towards none. He would come like a gust of fresh air, refreshing and intellectually stimulating. Never boring or mundane!

But like the welcome invigorating gust of wind, he would come and go at will, not bound by the strangulating rituals or commitments probably because he had so many friends, and all of them thought he had a 'special bond' only with them. Whether they be classmates like Ramen Gupta, the basketball player, who went on to become the captain of the Indian Basketball team, Pawan Shorey, the ophthalmologist and sensitive writer, or Ajay Jain, the IITian, Aditi and Ajay Mehta of Mohan Singh Mehta's family, who ran the well-known NGO *Seva Mandal* in Udaipur or Patti ji of Ranthambore Tiger Sanctuary or the people of Todgarh village. He stayed at these places and with these people, for months and sometimes years, regaling their lives with

laughter and mirth, and being there with them, with child-like innocence and sincerity, when they needed solace in untangling the emotional, professional or any other challenges and difficulties that life threw at them. They needed the hand-holding and emotional support that Nihal provided. His sincerity and genuine caring gave them the strength and courage to re-examine and re-assess their own values and perceptions and redefine their approach. And all this was not 'preachy' but rendered with 'smile and humour.'

Shorey remembers how inadequate he was feeling when he joined SMS medical college after St. Xavier's School. To put it mildly, the approach and the environment were different. Nihal had seen Shorey in

school in the English classes.

There was a flair for 'writing' and 'sensitivity' to observe and understand people and environment. The Father, who was teaching

English, had also noticed this and had publicly praised him before the classmates. Nihal bought a lot of books and gave them to Shorey to read and get along with life, without

making of the BBC documentary, Nihal would come often to discuss these projects. His historical research and documentation were painstakingly done, which had Nihal's stamp on it. Sharp intellect and capable of in-depth analysis, he was supposed to be ideally suitable for civil services. But being too 'creatively inclined' and having difficulty in being cast in any predecided mould probably disqualified him to be an IAS, as many of his contemporaries at St. Stephen's opted for. He just could not be a 'careerist,' whether IAS or acquire any conventional role which required conformity all the time. That doesn't mean Nihal was a boorish, unpolished and uncouth simpleton. He had a fine taste for the good things in life like *campari*, *kebabs*, sharkskin trousers, reading and music.

But what distinguished him from the usual urban 'elite' was his generous nature, where he felt happiest in sharing these 'goodies' in life with all his friends. He selflessly spent the five-six months in his last year of life, when he was not well, compiling and producing the '*directory*' of his batchmates of school for the batches' golden jubilee.

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## #GOOD-BYE

It is last words to me, four days before he went, were, "*Bhai Sahib*, it does not matter to me whether I stay or go. I am at peace with my self. I have had a good life, a wonderful loving and caring family, bunch of great friends and had an enlightened and enlightening *guru*, who was always loving, patient and explaining complexities of life." What a happy life and what a happy ending!

One such friend's self-confession was from a batchmate, who shedding all inhibitions, asked in one of these revealing chats, "Why does everyone in the class dislike me so much?" Nihal candidly answered, "Because you were too good, best and stood shoulders above us all, mundane people like me, whether it be science, humanities or sports, you made us look so small and ordinary."

Strange as it may seem, Nihal knew when he was compiling the matter for the *directory* as he shared with me, "I will not go to Pushkar. It is health reasons, though I know everyone will insist." Then, he added with a twinkle in his eye, "I will not be able to stand these bums for three nights and I have left drunken boisterous revelry far behind, long back."

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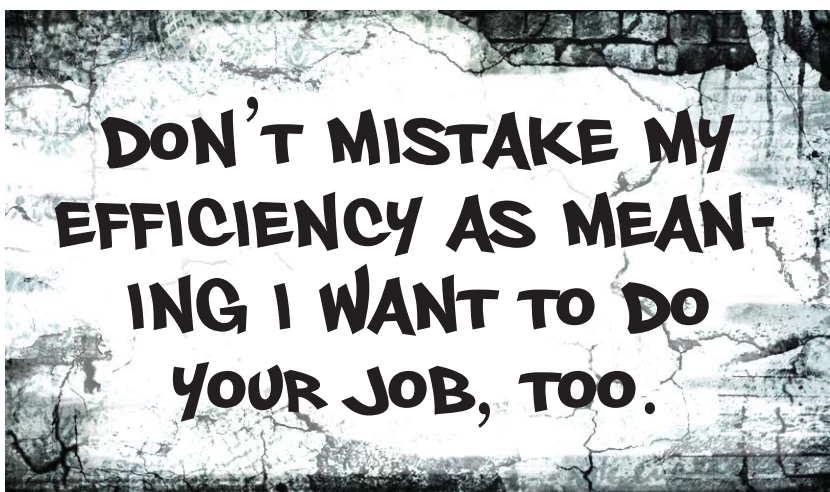
Minutes before he was to pass away, he told his sister, "Don't hold me back. Let me 'free' and let me 'go.' My *guru* awaits me. My destination is awesome, beautiful and happy."

What a happy life and what a happy ending! Farewell Nihal, your fragrance will linger for long, in every one you touched in life with your presence.

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## THE WALL

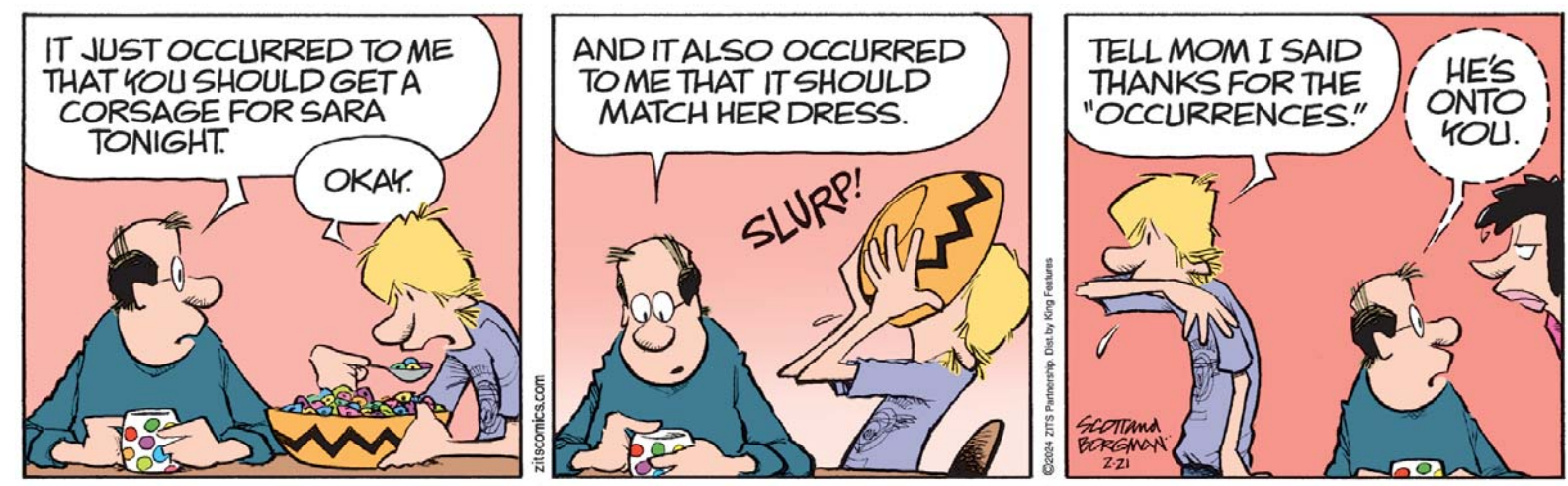


## BABY BLUES



By Rick Kirkman & Jerry Scott

## ZITS



By Jerry Scott & Jim Borgman