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# Technology that measures cell-by-cell variation in growth rates could impact many fields

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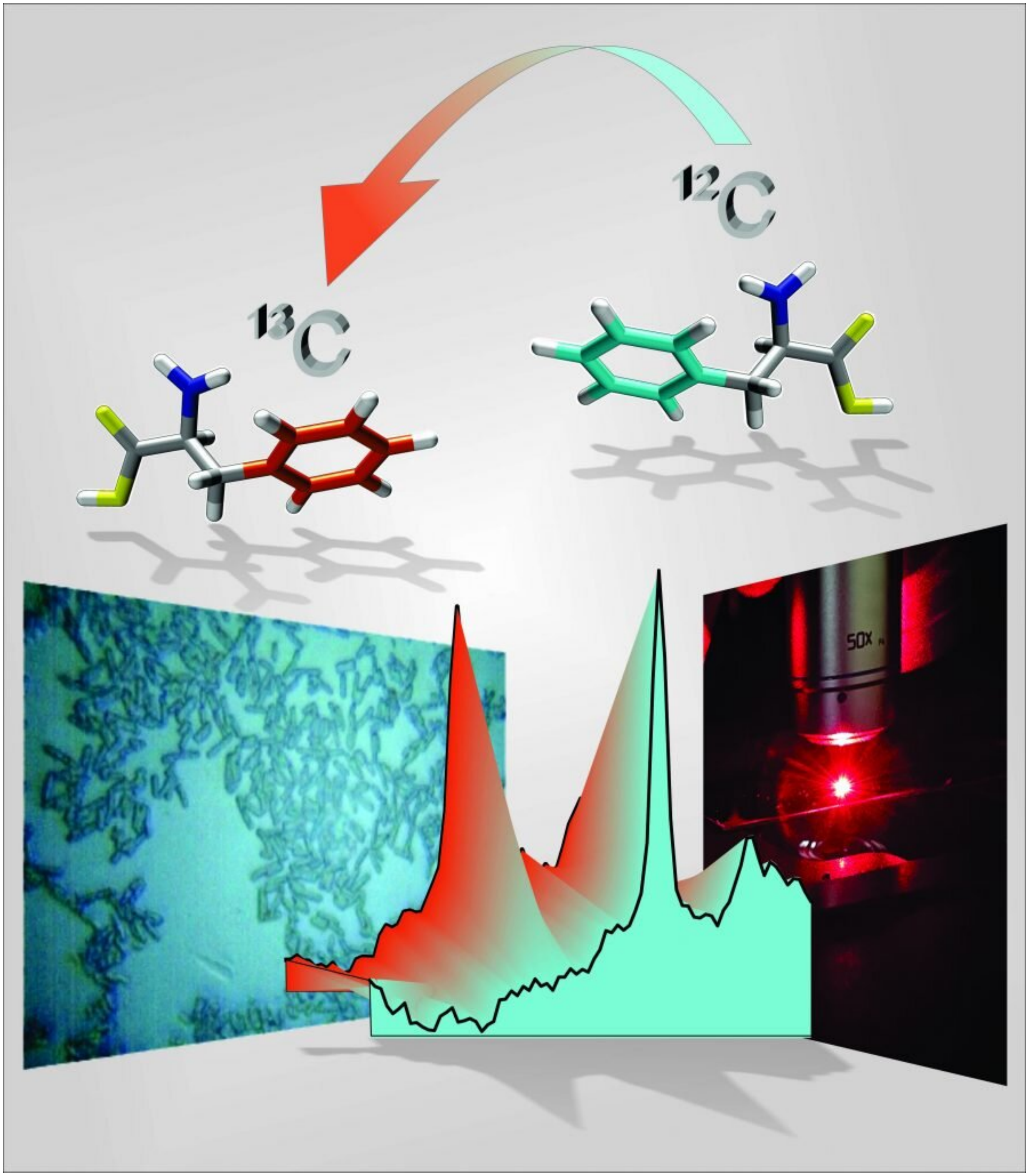


This montage shows a bacterial cell population by way of a Raman microspectrophotometer and a measurement assimilation of carbon-13 of the population's proteins. Detection of the carbon-13 enrichment in individual bacterial cells helps to calculate microbial growth rates at the single-cell level. Credit: T. Zaliznyak

The genomic revolution has enabled researchers to assess cell-by-cell genetic variations, but very few techniques exist to measure cell-by-cell metabolic variations, a more powerful way to understand cell responses to changing environmental conditions. Researchers from Stony Brook University's School of Marine and Atmospheric Sciences (SoMAS), led by Gordon T. Taylor, Ph.D., demonstrated that Raman microspectroscopy can accurately measure cell-by-cell variations in growth rates of the bacterium E. coli grown in a broth medium. They validated the Raman-based technique against independent traditional population-based spectroscopic and mass spectrometric measurements.

"The technique emerging from our laboratory can be applied to the study of free-living and host-associated microbiomes, which could prove crucial in understanding more about their functional responses to stressors," says Taylor, Professor and Director of the NAno Raman Molecular Laboratory (NARMIL) at SoMAS. "We also believe this is an enabling technology to examine individuality in cell populations and could have broad applications in microbiology, cell biology and biomedicine."

Details of the technique and results are published in the American Society of Microbiology's *Applied and Environmental Microbiology*. A visual of the technique is also highlighted on the cover of the journal edition.

**More information:** Felix Weber et al, Using Stable Isotope Probing and Raman Microspectroscopy To Measure Growth Rates of Heterotrophic Bacteria, *Applied and Environmental Microbiology* (2021). DOI: 10.1128/AEM.01460-21

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