Zooma med en kemidoktorand – VT26

Analytisk kemi och miljökemi

A1	**Analytical chemistry to study the earth's atmosphere** There are so many substances in the earth's atmosphere that can affect climate and air quality, which can cause problems for humanity if not monitored properly. In our research, we are applying analytical chemistry, especially Mass Spectrometry, to study these substances in our atmosphere.
A2	**What's in the air we breathe and how can we catch it?** The common air pollutants and the everyday places where we are exposed to them will be presented as an introduction. After that, we will explore how passive air samplers capture these pollutants, highlighting new research on Polydimethylsiloxane foam as an advanced material to improve air sampling in environmental studies.
A3	**Heavy metal contamination in Swedish soils** Heavy metals include lead (Pb), cadmium (Cd), mercury (Hg), copper (Cu), and zinc (Zn), as well as metalloids such as arsenic (As). These elements can be toxic to living organisms even at low concentrations. In Sweden, they mainly come from human activities and are deposited onto soils through emissions, leading to contamination. In this presentation, I will talk about how we measure and analyse contamination of heavy metals in Swedish soils.

Kemiteknik

K1	**Seeing atoms in action: Exploring materials with world-class synchrotron X-ray methods** With powerful synchrotron X-ray methods like XPS and XRD, we can find out what elements are on a material's surface and how the atoms inside are arranged. In this talk, I will show how these techniques let us watch materials change in real time during processes like corrosion or mechanical loading, helping us see "what happens to atoms" when materials are used in the real world.
~~**K2**~~	~~**How industrial waste could help stop global warming**~~
K3	**Process-related CO_2 reduction** Winter is not coming!!! Global warming is changing winters in Sweden and worldwide. Greenhouse gases, especially CO_2 from transportation and industry, are major culprits. Reducing these emissions requires green industrialization. We are researching an optimized industrial process to significantly reduce CO_2 emissions while simultaneously boosting efficiency.

Biokemi

B1	**The wonders of cellular boundaries** Every living organism - from bacteria to humans - is made up of cells. Each cell is wrapped in a flexible, dynamic and protective barrier called the cell membrane. In my talk, you will learn about the fascinating structure, organization and function of cell membranes, the different tools we use in our laboratory to study them and how this knowledge can help us understand disease and improve medicines and vaccines! You'll also hear what it's like to be a scientist working at the intersection of chemistry, biology, physics and computer science!
B2	**The difference in protein signatures between autoimmune diseases** Systemic autoimmune diseases are challenging to diagnose due to complex and overlapping symptoms. Every human has a unique combination of protein levels in their blood, their "protein signature", that also changes with disease manifestation. In my talk I will cover what makes autoimmune diseases interesting and the future potential for early diagnosis or treatment by using blood protein signatures.
B3	**Enzymes from nature catalyst to laboratory produced tools** Systemic autoimmune diseases are challenging to diagnose due to complex and overlapping symptoms. Every human has a unique combination of protein levels in their blood, their "protein signature", that also changes with disease manifestation. In my talk I will cover what makes autoimmune diseases interesting and the future potential for early diagnosis or treatment by using blood protein signatures.
B4	**Blodplasmaprofiler av människans sjukdomar** Som en del av Proteinatlasen har vi profilerat proteinnivåerna i blodplasma hos några av våra mest vanligaste och även sällsyntaste sjukdomar. Detta kan bana väg för nya biomarkörer, läkemedel och förståelse av dom mänskliga sjukdomarna.
B5	**Vilka gener är aktiva i cancertumörer?** Spatial transkriptomik är en metod som forskare använder för att studera hur celler fungerar i vävnader, till exempel i kroppen. Metoden gör det möjligt att se var i vävnaden olika gener är aktiva. Jag kommer att förklara hur metoden fungerar och visa hur den kan användas för att studera till exempel cancertumörer.
B6	**Leverns roll i Alzheimers sjukdom** Kroppen är ett komplext system av biokemiska processer och det mycket vi fortfarande inte vet! Vi har t.ex. känt till Alzheimers sjukdom i 100 år, men vet fortfarande inte vad det beror på. I ett av mina projekt tittar jag på hur det skadliga proteinet amyloid beta, som ansamlas i hjärnan under Alzheimers sjukdom, kan brytas ner i levern med hjälp av kroppens enzymer. Jag studerar också hur våra gener påverkar sjukdomsförloppet och tänkte ta upp att det är viktigt att titta på många olika populationer av människor.
B7	**Karakterisering av membranproteiner** Min presentation handlar om två olika membranproteiner, som har hög relevans som målmolekyler vid framtagning av läkemedel mot Alzheimers sjukdom, cancer och diabetes typ-2. Jag kommer att gå in på strukturell och funktionell karakterisering av dessa två membranproteiner.

Materialkemi

M1	**A Laboratory in your pocket: how portable science is changing health and the environment** The future of science isn't locked in a lab. It is small enough to hold in your hand. Can you imagine detecting diseases with a piece of candy or testing water quality with a simple sheet of paper? In this talk, we will discover how scientists turn everyday objects into powerful tools to explore hidden environments and solve real-world problems. Through surprising examples from our own research at the university, we will learn how chemistry, biology, engineering, and technology work together to transform ordinary objects into clever scientific devices. By the end of the talk, we'll start noticing laboratories everywhere, hidden in the tiniest things around us.
M2	**Metal-organic frameworks - from the discovery to usefulness** The pioneers of metal–organic frameworks (MOFs) were awarded the 2025 Nobel Prize in Chemistry. I will begin with a brief explanation of what MOFs are and their discovery story. I will then introduce several exciting applications to demonstrate how versatile these materials are. Finally, I will highlight some useful tools that students can use to explore MOF structures.
M3	**Elektrokemiska metoder för hållbar batteriåtervinning** Litiumjonbatteriet är en viktig komponent i datorer, elbilar och mobiltelefoner. Metaller som litium, nickel och kobolt i uttjänta batterier behöver återvinnas men konventionella metoder är tekniskt begränsade och leder till miljöpåverkan. Detta projekt fokuserar på elektrodialys - en lovande metod som kräver mindre skadliga kemikalier och ger färre restprodukter.
M4	**How is my phone battery recycled?** When you get a new phone, you don't usually think about what happens to the old one; you trust it will be recycled. But what does this recycling process entail? What physical and chemical processes does it undergo? What can we really recover from it? Let's dive into the recycling process of hydro and pyrometallurgy: roasting, leaching, precipitation, solvent extraction and other techniques. And what researchers are doing to improve this process? How can you make your part of it?