INTERNSHIPS at BIOLOGICAL PSYCHOLOGY, VRIJE UNIVERSITEIT AMSTERDAM

2023-2024

The Department of Biological Psychology offers a wide variety of internships, including behavioural genetic, psychophysiological, and epidemiological topics, or internships focussed on statistical methodology. Internships are open to Bachelor and Master students within the Department of Biological Psychology but also, when sufficient background knowledge is present, for students from other departments and universities.

To apply for an internship, please read through the list of internship supervisors, choose one or more supervisors and follow the relevant procedure, as outlined below.

Bachelor students learning track Genes, Brain and Behaviour
You will be requested by the B-thesis coordinator to indicate the top-3 supervisors that provide topics you are interested in. The B-thesis coordinator will allocate the students equally across supervisors, taking into account as much as possible the preferences indicated by all B-thesis students. Note that you need to have followed the related minor and Methodology 3 course prior to enrolling in the B-thesis course.

Research Master students Genes in Behaviour and Health
You will be requested by the M1-thesis coordinator to indicate the top-3 supervisors that provide topics you are interested in. The M-thesis coordinator will allocate the students equally across supervisors, taking into account as much as possible the preferences indicated by all M-thesis students. After allocation, contact your supervisor right away to schedule a meeting to discuss a project.

All other Bachelor and Master programmes
If you are interested in doing a thesis with one of the Biological Psychology supervisors, send an email with a motivation letter, CV, and a list of your grades to the Internship coordinator, Dr Bruno Sauce (b.sauce.silva@vu.nl).

LIST OF INTERNSHIP SUPERVISORS AT THE DEPARTMENT OF BIOLOGICAL PSYCHOLOGY

Dr Michel Nivard

I am interested in cognition (the mental processes involved in gaining knowledge and comprehension), psychopathology and personality. I am basically interested in all or most psychological processes. I use genetic and family designs because they allow me to study causal relationships between psychological phenomena, which is essential if we want to be able to design successful interventions.

For an example of work on (the genetics of) cognition see:
https://www.biorxiv.org/content/10.1101/2020.01.14.905794v1
and
https://www.biorxiv.org/content/10.1101/2020.09.15.296236v2
For an example of my work on psychopathology see:
https://www.medrxiv.org/content/10.1101/2020.09.22.20196089v1
For an example of a (very successful) Master's thesis someone wrote supervised by me see:
https://thesiscommons.org/c4wz5

In these projects I often collaborate with **Wonuola Akingbuwa** and **Elsje van Bergen** with whom I also jointly supervise students. I am a great proponent of team science where we all collaborate regardless of level (PhD, B-thesis and M-thesis) to maximize learning and scientific discovery. I am open to student-initiated thesis ideas.

Some B-thesis topics:

- Effects of school performance (grades) and social position (bullying & Being bullied) on mood and the psyche and vice versa in primary school children
- The effect of parental SES/education on objective ability (CITO) and teacher judged ability. Do we provide a fair advice?

Requirements: My B-thesis projects typically require basic knowledge of R, an interested in (developmental) psychology, and minimal knowledge of genetics, stress physiology, and epidemiology.

Some M-thesis topics:

- Sex differences in depression, are the male and female manifestation of depression different at symptoms level?
- Sex differences in sibling interaction. Siblings may influence each other during development, are these mutual influences distinguishable from their common genetic and parental influences?
- Effects of school performance (grades) and social position (bullying & Being bullied) on mood and the psyche and vice versa in primary school children.
- The life course (genetic) epidemiology of cycling (for work and pleasure). Cycling is common in the Netherlands but still rare in other countries, we study the cost/benefit associated with cycling to work and for pleasure in terms of increased accidents, and better health using mendelian randomization and sibling differences analysis (comparing the health of a cycling person to their siblings health, controlling for upbringing and genetics).
- The life course (genetic) epidemiology of (excessive) TV/screen time. We test the effects of too much streaming on health using mendelian randomization and sibling differences analysis (comparing the health of an excessive TV watching person to their sibling's health, controlling for upbringing and genetics).
- The effect of parental SES/education on objective ability (CITO) and teacher judged ability. Do we provide a fair advice? Do genes and the environment interact to influence high school placement?

- Are polygenic scores for cognitive and non-cognitive skills predictive for upward social educational mobility form one generation to the next. Do genes and the environment correlate to shape mobility .
- Joint prediction based on PRS and structural genetic variants of severe psychopathology in UK Biobank (together with **Wonuola Akingbuwa**)

Requirements: Passed on the RM behavioural genetics course. Good statistical skills, knowledge of R.

Dr Elsje van Bergen

I am and associated professor and interested in the causes and consequences of individual differences in learning. In my research efforts, I integrate theories and methods from psychology, education, and genetics to study educational achievement. I'm particularly intrigued by how genetic and environmental influences on academic skills (like reading and math) work together in very complex ways. This is especially of interest in studying the effect of parenting.

I am a great advocate of team science where researchers with different strengths collaborate regardless of career stage to maximize learning and scientific discovery. If you'd like to know more, please take a look at www.evanbergen.com or follow me and BioPsy on Twitter, @drElsje & @NTRscience. If you'd like to read one of my papers, I'd go for this one: "Nurture might be nature" https://www.nature.com/articles/s41539-020-00079-z.

M-thesis topics:

- Dr Bruno Sauce and I would like to co-supervise a pair of RM1 students on the topic of polygenic-score prediction of cognitive development and changes in educational achievement. From twin research on intelligence, we know that heritability gradually increases during childhood and adolescence. Do we see this mirrored in an increased polygenic score prediction of educationally-relevant traits? We will use data from the Netherlands Twin Register and pre-register the study. The two students will work independently on their own thesis on their own sub-question within the overall project. We will have weekly meetings with the four of us so the students can support each other. This project will build upon a project by our pair of RM1 students from last year. After the theses, we intend to form the work into a paper to submit to a scientific journal for publication, with all four students as authors.
(With **Dr Bruno Sauce**)

Requirements: Interest in statistical modelling, interest in developmental science, good statistical knowledge, and experience with the R programming environment.

Dr Bruno Sauce

My research focuses on the gene-environment interplay of intelligence. I want to know the impact of certain experiences on the way we think and learn, and how much this depends on our different genetic backgrounds.

I look at potentially impactful (or controversial) experiences like playing video games, growing up in wealth/poverty, going to school, physically exercising, sleeping well, and training with educational apps. I use twin analyses, latent change score models, and polygenic score analyses in large datasets such as the Netherlands Twin Register and the Adolescent Brain Cognitive Development. This paper I wrote has the foundations for much of what I do:
https://psycnet.apa.org/record/2017-48711-001
(If you are interested, a quick skim will do already. It's a long paper and only some of it is worth it!)

There are other topics I'm also super interested in (and have done or am doing research on): creativity, social inequalities, stress, motivation, internet/social media use, the Flynn effect, etc.

If you would like to know more, please take a look at www.brunosauce.net (where you can also find pdfs for all my publications).

I am open to student-initiated thesis ideas. If you are short on ideas, here are a few suggestions to warm up your creative engines:
- Do different types of video games have different associations with intelligence?
- How much is our time spent using digital media (social media, streaming, etc.) predicted by polygenic scores for intelligence, ADHD, and/or impulsivity?
- Does the number of steps we walk and/or the quality of our sleep associated with intelligence? Is this association also genetic?
- The impact of educational interventions in Dutch primary schools. Is it better than standard schooling?
- How much do initial abilities matter during school? Are differences in intelligence magnified or reduced by schooling? Is that independent of genetic effects?
- The role of certain experiences and mental disorders on creativity.
- The genetic and environmental sources of differences in the cognitive complexity of professions.

Note for M-thesis
Dr Elsje van Bergen and I would like to co-supervise a pair of RM1 students on the topic of polygenic-score prediction of cognitive development and changes in educational achievement. From twin research on intelligence, we know that heritability gradually increases during childhood and adolescence. Do we see this mirrored in an increased polygenic score prediction of educationally-relevant traits? We will use data from the Netherlands Twin Register and pre-register the study. The two students will work independently on their own thesis on their own sub-question within the overall project. We will have weekly meetings with the four of us so the students can support each other. This project will build upon a project by our pair of RM1 students from last year. After the theses, we intend to form the work into a paper to submit to a scientific journal for publication, with all four students as authors.
(With **Dr Elsje van Bergen**)

Requirements: Knowledge of genetics and statistics. Experience with the R programming environment.

Prof dr Conor Dolan

My research interest is in the development and application of structural equation modelling (SEM) in genetically informative designs, such as the classical twin design. These applications include causal modelling, psychometrics, and modelling of "genotype – environment interplay" (GxE interaction, G-E correlation) using polygenic scores.

Possible B- or M-thesis topics, co-supervised with Prof Dorret Boomsma:

The continued data collection in the Netherlands Twin Register, both in children and in adults, allows for comparisons across a 25 year period of behavioral and emotional problems. We offer 2 projects on ADHD: **is there a trend over 25 years in adhd symptoms in children (3-12) as rated by their parents and / or teachers?**
Is there a trend over 25 years in adhd symptoms in adults?

The ASEBA set of assessments of behavioral and emotional problems in adults has been extended by a set of forms dedicated for persons over 60 years (see: The generalizability of Older Adult Self-Report (OASR) syndromes of psychopathology across 20 societies. Ivanova MY, et al. Int J Geriatr Psychiatry. 2020 May;35(5):525-536. doi: 10.1002/gps.5268). we collected this survey in NTR participants and aim to carry out the first genetic analyses of the OASR: **Heritability of behavior problems in older people** by genetic model fitting.

We have analyzed data collected in young twins of cross-gender behavior to estimate its heritability (e.g. Genetic and environmental influences on cross-gender behavior and relation to behavior problems: a study of Dutch twins at ages 7 and 10 years. van Beijsterveldt CE, Hudziak JJ, Boomsma DI. Arch Sex Behav. 2006. 35(6):647-58. doi: 10.1007/s10508-006-9072-0)**.** These ratings were supplied by parents of twins. Some overlapping information is collected from teachers and we aim to carry out : **Genetic analyses of teacher data of 'behaving as the opposite sex',** taking into account that children can be rated by the same or by different teachers (at age 7, 10, 12 years)

Twin correlations of externalizing phenotypes (e.g., inattention, hyperactivity) often suggest the presence of genetic non-additivity (dominance) in children because of the pattern of twin correlations, where $2*rdz << rmz$ (rmz and rdz are the monozygotic and the dizygotic correlations, respectively). However, this $2*rdz << rmz$ can also arise in the presence of negative A-C covariance (covAC). By combining polygenic riskscores and phenotypic data in twin data, we can estimate A-C covariance. The aim of this project is to analyze real twin data to compare the ADE model and the ACE with (negative) covAC and address the question: **Is dominance in externalizing phenotypes due to negative A-C covariance?**

Requirements: students who are interested in the applications or development of genetic SEM should have an interest in applied statistics, data simulation and programming in R.

Prof dr Dorret Boomsma

My research interest lies in the causes of population variation in health, human behaviour and cognition. I approach explanations of individual differences in humans from the perspective of genetics. This perspective has a firm basis in the theory of quantitative genetics and I believe this approach is the strongest to elucidate etiological pathways to complex behavioural and neuropsychiatric traits and common diseases. For my research, I established the Netherlands Twin Register (NTR: tweelingenregister.vu.nl) in 1987. The NTR collects epidemiological data by longitudinal surveys and in-depth phenotypes in subgroups including biomarker data. One of my longstanding interests is the genetics of twinning and fertility, and twinning as a risk factor for health.

Possible B- or M-thesis topics, co-supervised with Prof Conor Dolan:

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Requirements: interest in multiple births and research in and with multiple births, endocrinology; ability to handle large data sets (or the willingness to learn this in spss), basic statistical skills.

Prof dr Meike Bartels

My line of research is focussed on understanding the causes of individual differences in wellbeing. It strikes me that the current attempts to reduce and prevent illness pay limited attention to the large group of healthy and happy people. Instead of wondering why people are ill and invest largely in unravelling the risk factors, one should also wonder why so many people are protected or resilient. Why do many individuals stay healthy and happy even when faced with severe adversity? What are the protective factors? And finally, why are most people happy most of the time? To answer these questions a shift in approach is needed that includes healthy and happy people, people who are not healthy but still happy, and people who are healthy yet unhappy. In these groups, the causes of individual differences in wellbeing should be assessed as a function of not only environmental risk and protective factors, but also as function of biological and genetic risk and protective factors. Within my line of research, I want to contribute to finding answer to these societally highly relevant questions by applying an interdisciplinary focus on genetics, environment, and its complex interplay. These are just examples of questions that could be addressed in internships. Students are welcome to bring their own questions related to these fields. Feasibility of course depends on the available data or the active data collection in ongoing experiments.

Some B-thesis topics:

- Are optimist individuals happier or does a half empty glass not influence overall wellbeing?
- Individual differences in Flourishing and meaning of life

Requirements: My B-thesis projects typically require basic statistical skills, knowledge of SPSS/R and minimal knowledge of regression analyses and uni- and multivariate twin modelling.
B-thesis students should follow the learning track Genes, Brain and Behaviour.

Some M-thesis topics:

- Do happy people pick different environments? (Active Gene-Environment correlation for Wellbeing)
- Individual differences in Flourishing and meaning of life
- Social support and wellbeing

Requirements: Passed on the RM behavioural genetics course. Good statistical skills, knowledge of SPSS, and ideally R.

Dr Dirk Pelt

I am a postdoctoral researcher working on a project on the environmental and genetic influences on wellbeing. I have a background in psychometrics and individual differences research, and currently my focus is on the relation between personality and wellbeing. Example questions that drive my research interests are: to what extent are personality traits and wellbeing influenced by the same genetic factors? Do good social relationships lead to more wellbeing for everyone, or perhaps more so for certain types of people (e.g., extraverts) than for others (e.g., introverts)? Do individuals' social skills moderate the (genetic) relations between social support and wellbeing?

Recently, I have developed an interest in the use of machine learning methods to answer several research questions. One area is the assessment of well-being by applying machine learning algorithms to individuals' posts on social media. The other area is the use of machine learning to optimize our prediction of well-being using big datasets. For the latter project, collaborations with the VU Campus Center Artificial Intelligence & Health (https://www.ai-health.nl/) are possible and encouraged.

I am also strongly interested in psychometrics and statistical methods, so students are also welcome to come up with their own questions with a more methodological character.

Some example B- or M-thesis topics:

- The genetic overlap between personality and self-esteem
- The relation between emotional intelligence, social support and well-being from a genetic point of view
- Can we predict people's well-being based on their posts on Twitter?
- Can machine learning algorithms increase our prediction, and understanding, of well-being and depression?

Requirements: B-thesis projects: basic statistical skills, knowledge of SPSS/R and minimal knowledge of regression analyses and (ideally) twin modelling.

M-thesis projects: Passed on the RM behavioural genetics course. Good statistical skills, knowledge of SPSS, and ideally R.

Dr Dennis van 't Ent

I am a researcher in the field of neuroimaging genetics and at the department I am the contact person for access and use of neuroimaging data. My personal interest is in exploring individual differences in brain structure and function and how these differences relate to individual variation in cognitive and psychological traits. To this end I collect and analyze neuroimaging data, mainly MRI, in genetically informative samples of monozygotic and dizygotic twins and additional family members.

Some examples of possible B- or M-thesis topics:

- Associations between externalizing behaviours and brain structure
- Investigating genetic and environmental contributions to brain-aggression relations by means of bivariate twin modeling
- Investigating the relationship between different behavioural phenotypes and computed brain age
- Investigating the relationship between polygenic scores, metabolomic and neuroimaging measures, and their role in externalizing behaviours
- Investigating the relationship between genetic/epigenetic background and computed brain age

Requirements: Good statistical skills, experience with statistical programming environments (SPSS/R). Basic knowledge of the brain.

Dr Jenny van Dongen

Epigenetic mechanisms regulate the expression of genes in cells, and can respond to environmental influences. My research focuses on these epigenetic mechanisms, in particular DNA methylation. I work with data from the Netherlands Twin Register (NTR) within national and international collaborative projects to study the causes of individual differences in DNA methylation, and to study the connections between DNA methylation, other omics layers, and complex traits. For a B-thesis, students can perform a (discordant) twin analyis on a small set of variables. For an M-thesis, students can analyse genome-wide DNA methylation data. Students can work with me on one of the following research projects..

M-thesis topics

- **Monozygotic twinning**. In this project, we study the role of DNA methylation in monozygotic twinning (the process by which monozygotic twins arise). We previously identified a strong DNA methylation signature in blood cells and buccal cells from twins. In ongoing work, we follow up on this finding by analyzing novel DNA methylation array (Illumina EPIC) datasets from twins, siblings of twins, and triplets.
- **Effect of cannabis use on DNA methylation**. In an international consortium study in which the NTR participates, we have previously identified DNA methylation differences associated with life time cannabis use. The next step in this project is to compare DNA methylation profiles from monozygotic twins who are genetically identical but discordant for lifetime cannabis use (one twin has used cannabis and the twin brother/sister has never used cannabis). This group of twin pairs will also be compared to pairs who are concordant for lifetime cannabis use. The aim is to get closer to answering the question: does cannabis use cause differences in DNA Methylation?

Requirements M-thesis: Passed on the RM course Epigenomics and sequencing in behaviour and health. Passed the RM course on Statistical Programming in R (or a different R course).

B-thesis topics

- **Effect of cigarette smoking** on epigenetic clocks. Epigenetic clocks are widely studied biomarkers of ageing; they are utilized to obtain a measure of a person's biological age based on a DNA methylation profile in blood or buccal cells. The aim of this project is to examine the effect of cigarette smoking on biological age through the use of epigenetic clocks with a discordant monozygotic twin design (we compare the epigenetic age of twins who smoke to their twin brother/sister who does not smoke).

Requirements B-thesis: My B-thesis projects require basic statistical skills, knowledge of R or SPSS and a genuine interest in epigenetics.

Dr Jouke- Jan Hottenga

All my research is related to finding genes for complex traits, which I have been doing for the last 25 years. First in family-based studies, and later in population-based studies. My expertise is quality control, alignment, imputation and statistical analysis of genotype data. Furthermore, I am developing bioinformatics analysis pipelines to do this more efficiently in a Linux based environment. Recently, I have been focusing more on Polygenic Risk Scores and the nature of nurture by examining the effect of untransmitted parental haplotypes on the kids' phenotypic diversity. In line with this research, I also have been doing several population genetic studies with the Netherlands Twin Register (NTR).

If you want to do a Bachelor or Master internship with:

- Genotype data quality control
- Imputation
- Genome wide association
- Analysis of transmission of alleles in families
- Population genetics
- Genetic data analysis validation
- Polygenic Risk Score Prediction

then you're welcome to come and do this for the phenotype(s) in which you are interested. Note that a limitation is that this phenotype should be present for enough genotyped individuals within the NTR to make a sensible study. And of course, I would like to have a short online interview with you, how the chosen topic fits our current ideas & research, as well as if the topic fits the requirements of a full Bachelor or Master internship at the VU.

Some examples of possible B- or M-thesis topics:
- The chromosome X variant DNA distribution over the Netherlands.
- How much trait heritability is explained by PGRS for a given phenotype?
- Does genotype imputation improve or decrease the explained variance of PGRS?
- Is / are "known" gene(s) X involved in trait Y within the NTR?
- Is method X vs. Y for GWAS or PGRS better or worse in detecting variants?
- Running a GWAS on phenotype X,Y,Z
- Can Ancesrty be captured using a GRM instead of PCs?

Dr René Pool

I am a researcher in the field of metabolomics. As such I manage the metabolomics data hosted by the Netherlands Twin Register (NTR). We try to link individual differences in other omics layers (e.g., genomics, epigenomics) or higher level phenotypes (e.g., behavioural traits) to metabolic fingerprints of participants. In doing so we aim to gain insights in how omics levels are interconnected but also how such connections ultimately lead to biological (dys)function. I am also involved in the generation of polygenic risk scores in the NTR sample and establishing a database of those for over 200 phenotypes.

        As the work at the department of Biological Psychology often involves computation, we are (heavy) users of (national) high performance computing facilities. At the department I am the contact person for access to and use of such infrastructures. You can expect an internship with me to contain a nice mix of computational science and molecular biology.

Some B-thesis topics:

- Modelling the interaction between metabolites at the phenotypic and at the genetic levels
- Estimating the heritability of metabolites
- Generation of hypotheses based on metabolites available at the NTR

Requirements: Basic statistical skills, some knowledge of R or python, basic understanding of molecular biology.

Some M-thesis topics:

- Modelling the interaction between metabolites at the phenotypic and at the genetic levels
- Estimating the heritability of metabolites
- Generation of hypotheses based on metabolites available at the NTR
- Associations between twinning and transcriptomics
- Associations between twinning and metabolomics
- Exploring and evaluating methods for generating polygenic risk scores

Requirements: Good statistical skills, knowledge of R or python, good understanding of molecular biology.

Dr Camiel van der Laan

My work focuses on improving the infrastructure to conduct research using data from Statistics Netherlands (CBS). Specifically, I am interested in utilizing CBS' information on family ties in order to apply genetically sensitive designs for a wide variety of research questions. Some related questions that could be addressed in internships are: Is family composition related to certain outcomes (for example, income or illness)? Do twins differ from non-twins on certain traits? What methods can we use to successfully leverage the benefits of within twin analyses when zygosity of same-sex twins is unknown? I also very much welcome students to come up with their own research topics that are uniquely suited to be studied using CBS data. In recent years my genetic epidemiological research has been focused on aggression and rule-breaking behaviour. Much of my work focused on the role of family in driving individual differences. For example, I studied the clustering of aggression within families, the relative influences of environment and genes in intergenerational transmission of aggression, and whether genetic influences on aggression in early-life continue to affect aggression across the life-course. I am very interested in research questions related to aggression, such as whether there is a genetic explanation for an observed correlation between heart rate variability and aggression, and is there a causal pathway between these traits? I have experience in genome-wide association studies, (longitudinal) polygenic score analyses, and multilevel/mixed effects analyses.

Some B- or M-thesis topics:

- Twins in CBS:
    - Do they differ from non-twins?
    - How can we perform (within-) twin analyses when zygosity is unknown?
- Genetic and environmental influences on (the stability of) antisocial behaviour across the life-course
- Does the relationship between potential risk factors and antisocial behaviour hold in within-family designs?
- Is there a genetic basis for an observed correlation between heart rate variability and aggression?
    - Is there a causal pathway between them?

Requirements: Good statistical skills, knowledge of R.

Prof dr Eco de Geus

I am an active researcher in the fields of genetic psychophysiology and genetic epidemiology. My psychophysiological research is focused on the ambulatory assessment of autonomic nervous system reactivity to daily life stress, and the individual resilience and susceptibility characteristics that modulate such reactivity. My genetic epidemiological research is focused on exercise ability and exercise behaviour. Why do some people become regular exercisers and others couch potatoes? To what extent are the associations between exercise behaviours and cardiovascular disease risk factors, or exercise behaviours and mental health causal?
These are just examples of questions that could be addressed in internships.
Students are welcome to bring their own questions related to these fields. Feasibility of course depends on the available data or the active data collection in ongoing experiments.

Some B-thesis topics:

- Effects of regular physical activity and/or fitness on psychophysiological stress reactivity
- Ambulatory assessment of physiological stress reactivity in case-control designs (e.g. hearing impaired patients versus normal hearing)
- Ambulatory assessment of physiological stress reactivity in genetically informative designs
- Validation of (commercial) wearables for psychological research
- Determinants of physical activity and inactivity

Requirements: My B-thesis projects typically require basic statistical skills, knowledge of SPSS/R and minimal knowledge of genetics, stress physiology, and epidemiology.

Some M-thesis topics:

- Genetic pathways involved in physical (in)activity at various ages
- Genomic prediction of athletic ability
- The role of gene-environmental interplay in autonomic nervous system functioning
- Causality testing in the exercise–mental health association
- Causality testing in the exercise–cardiovascular disease association
- Personality and sports preference: are runners introverts and team players extraverts?

Requirements: Passed on the RM behavioural genetics course. Good statistical skills, knowledge of SPSS, and ideally R/Matlab; background knowledge on the biology of the ANS.

Dr Martin Gevonden

I have a background in nuclear imaging and psychiatric epidemiology, but currently my main research method is measuring psychophysiology in daily life situations using wearables. The primary outcome is usually reactivity of the autonomic nervous system, but contextual factors and the ways to measure them are limitless. I am interested in the underlying technology, and how it can be used to map and manage stress and other psychological phenomena. This also often involves measuring people's psychological state by asking to frequently self-report using their smart phone. A big benefit of these measures in a situation of social distancing is that they can be collected off-site, out of the lab. Since this is a rapidly evolving field, many of my projects also evolve around developing, testing out, refining and applying new wearables and methods. Content-wise, I teach a course on substance use and addiction, and I believe in science as a means to achieve social justice, for example to close the (mental) health gap experienced by minorities, so I may have projects around those topics.

I have posted some example topics below, but I welcome creativity and often the best projects come forth out of a student's natural curiosity.

Some example B- or M-thesis topics:

- The trade-off between quality and user-acceptance when measuring stress physiology with a consumer smartwatch (e.g., Fitbit Sense) vs. a research device
- Dissecting the ethnic density effect: Can we predict mental health outcomes better from ecological momentary assessment than from retrospective questionnaires?
- The subjective and physiological effects of dexamphetamine on drug naïve volunteers
- Predicting exam results from physiological measures before, during and after the exam
- Hot stuff: How to separate emotional sweating from temperature based sweating
- Optimizing additional heart rate as an index of stress by classifying physical activity

Requirements: Statistical prowess, an affinity for data science (e.g., some projects require programming in R, Matlab or Python), interest in technology

Dr Wonuola Akingbuwa

I am a post-doctoral researcher in the field of statistical genetics, investigating the role of genetic variants in psychiatric traits across the allele frequency spectrum. The interdisciplinary nature of my academic training and research experience means that I have gained an appreciation for the importance of using different approaches to investigate psychiatric aetiology. As such my main research interests lie in the integration of different analytical techniques in order to gain a well-rounded view of the processes underlying psychopathology. I have used methods such as methods such as structural equation modelling, polygenic score analyses, and rare variant analyses using exome sequenced data, to investigate different psychiatric phenotypes including schizophrenia and depression. I am also open to discuss ideas outside of those listed, if students already have specific questions or other statistical genetic methodologies they are interested in exploring.
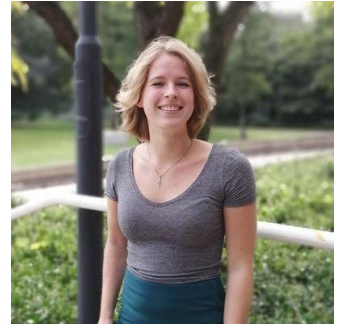
Possible B- or M-thesis topics:

- Investigation of shared genetic aetiology between traits, using polygenic scores (PGS)
- How much phenotypic variance is explained by PGS
- Joint prediction based on PGS and structural genetic variants of severe psychopathology in UK Biobank (together with **Michel Nivard**)

Requirements: Potential B-thesis students should follow the B3 learning track in Genes, Brain and Behaviour, as well as have some knowledge of regression analyses and programming in R.

M-thesis students should have passed on the RM behavioural genetics course, have good statistical skills, and knowledge of R.

Dr Lianne de Vries

My research focuses on the individual differences in (real-time) well-being and related traits. In my postdoc project, I am collecting Ecological Momentary Assessment data in twins, including real-time data on momentary self-reported positive and negative affect, well-being, whereabouts, social contacts, and lots of passive data collected through the smartphones of the participants, such as location, movement (step count, accelerometer and gyroscope data), and telephone use. (Preliminary) data of this extended new data set can for example be used to predict momentary mood or states from (social) environmental variables. The sample of twins allows twin modelling on the data as well, e.g., investigating the heritability of momentary mood or mood fluctuations, or bivariate twin models with well-being and one (or more) of the environmental variables. I recently finished my PhD dissertation, in which I also investigated the biology of well-being, and related traits including optimism, depressive symptoms, resilience and physical activity. I used different methods and analyses techniques, including twin modelling, polygenic risk score analyses and multilevel modelling. Therefore, ideas and research questions related to these topics and methods are also possible. I am open to ideas from students themselves.

Possible M-thesis topics (note: only M2-thesis):

- Genetic and environmental influences on momentary positive versus negative affect, affect fluctuations, or other measures of affect dynamics
- Genetic and environmental overlap between momentary well-being and telephone use (or any other environmental variable described above)
- Associations between momentary well-being and (social) environmental variables, such as quantity or quality of social contact, location, telephone use and/or movement.

Requirements:
M-thesis students should have passed on the RM behavioural genetics course, have good statistical skills, and knowledge of R.