

Defining the Future of Skin Health

Accelerating Skin Science to
Improve Human Health



**Asian Skin
Science**



**Translational
Innovation**



**Global
Impact**



Singapore's premier skin research institute under the Agency for Science, Technology and Research (A*STAR), driving world class research and innovation to shape the future of skin health



www.a-star.edu.sg/asrl

Who We Are

Your Gateway to Asian Skin Innovation

A*STAR Skin Research Labs (A*STAR SRL) is the central anchor for the skin research ecosystem in Singapore. Officially established as a dedicated institute in 2021, A*STAR SRL builds on more than a decade of national investment in skin biology, dermatological science, translational platforms and clinical collaboration.

We conduct high-value research encompassing fundamental skin biology, disease mechanisms, ageing, microbiome science, immunology, bioengineering and biophotonics. Our work is designed to [advance scientific understanding while creating pathways towards clinical application, commercial adoption and societal benefit.](#)

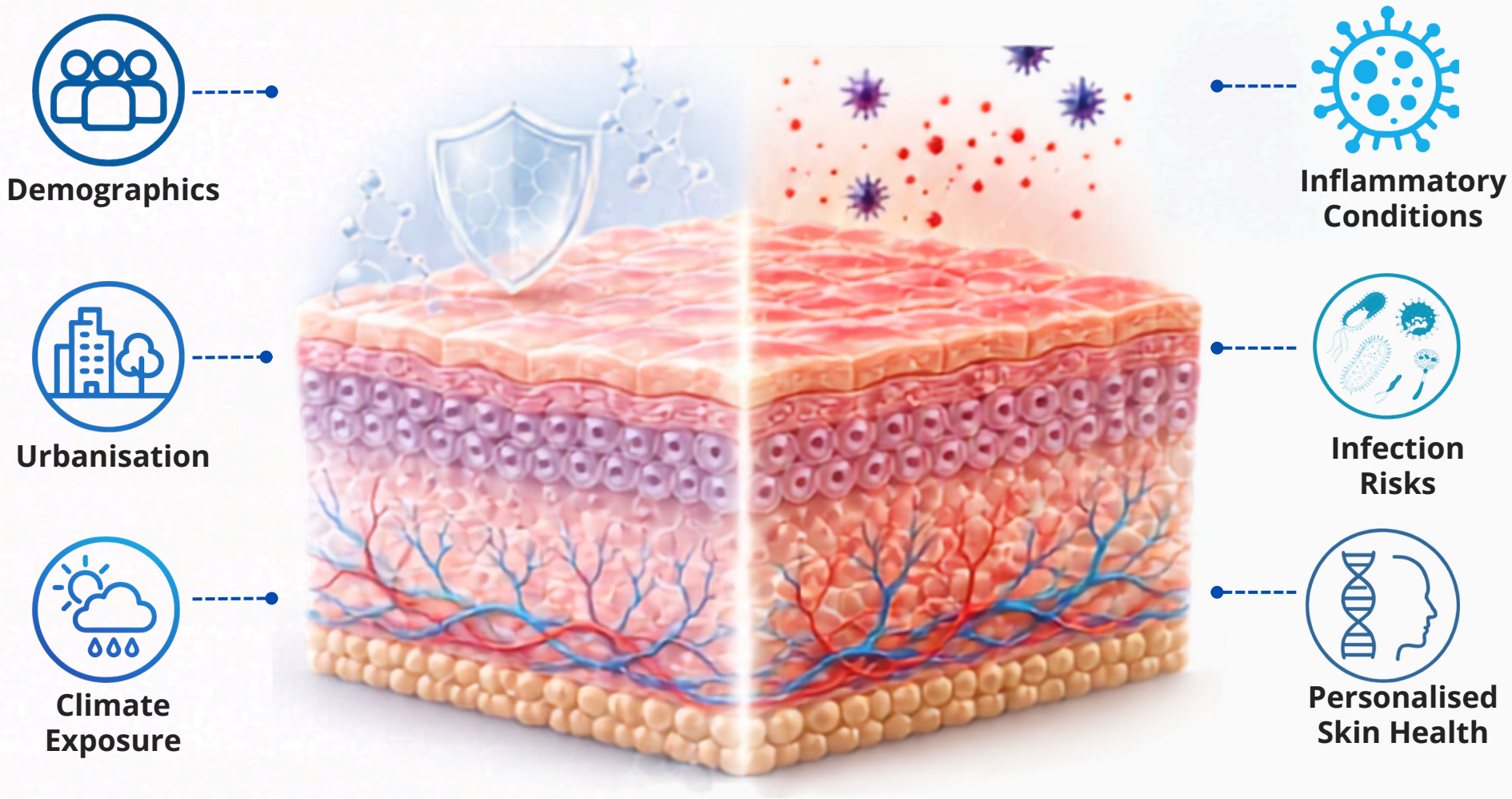
Through our role in the Skin Research Institute of Singapore (SRIS), a tripartite collaboration across A*STAR, NHG Health and Nanyang Technological University Singapore, [we connect researchers, clinicians, engineers and industry partners](#) to solve meaningful challenges in skin health.



Why Skin Research Matters

Skin Health is a Global Human Healthcare and Innovation Challenge

Skin is the body’s largest organ and a visible marker of health, disease, environmental impact and ageing. Across Asia and globally, changing demographics, urbanisation, climatic influences on skin health, chronic inflammatory conditions, infection risks and growing consumer demand for personalised skin health solutions are reshaping the need for robust, evidence-based skin science.



Why A*STAR SRL?



We combine deep expertise in skin biology, disease mechanisms and advanced technologies with access to unique Asian skin cohorts, clinical partnerships and translational platforms. A*STAR SRL is uniquely positioned to bridge healthcare and consumer skin health needs.



Collaborate with Us

Delivering Impact through Partnerships

From Scientific Discovery to Real-World Impact*



120+

Industry, academic and clinical partners



240+

Technology disclosures



60+

Patents



6

Start-ups launched



1200+

Publications

Creating Impact Across the Skin Research Value Chain



Consumer & Skincare Innovation

Long-standing partnerships with companies have translated skin and hair research into product innovations, supporting ingredient discovery, validation and product development and thus, providing scientific evidence and testing capabilities to inform new and improved products.



New Ventures & Therapeutics

Research discoveries have generated opportunities in intellectual property, licensing and new ventures. This includes spin-offs advancing innovative regenerative medicine technologies, hyperpigmentation therapy and a venture developing novel approaches for serious genetic diseases.



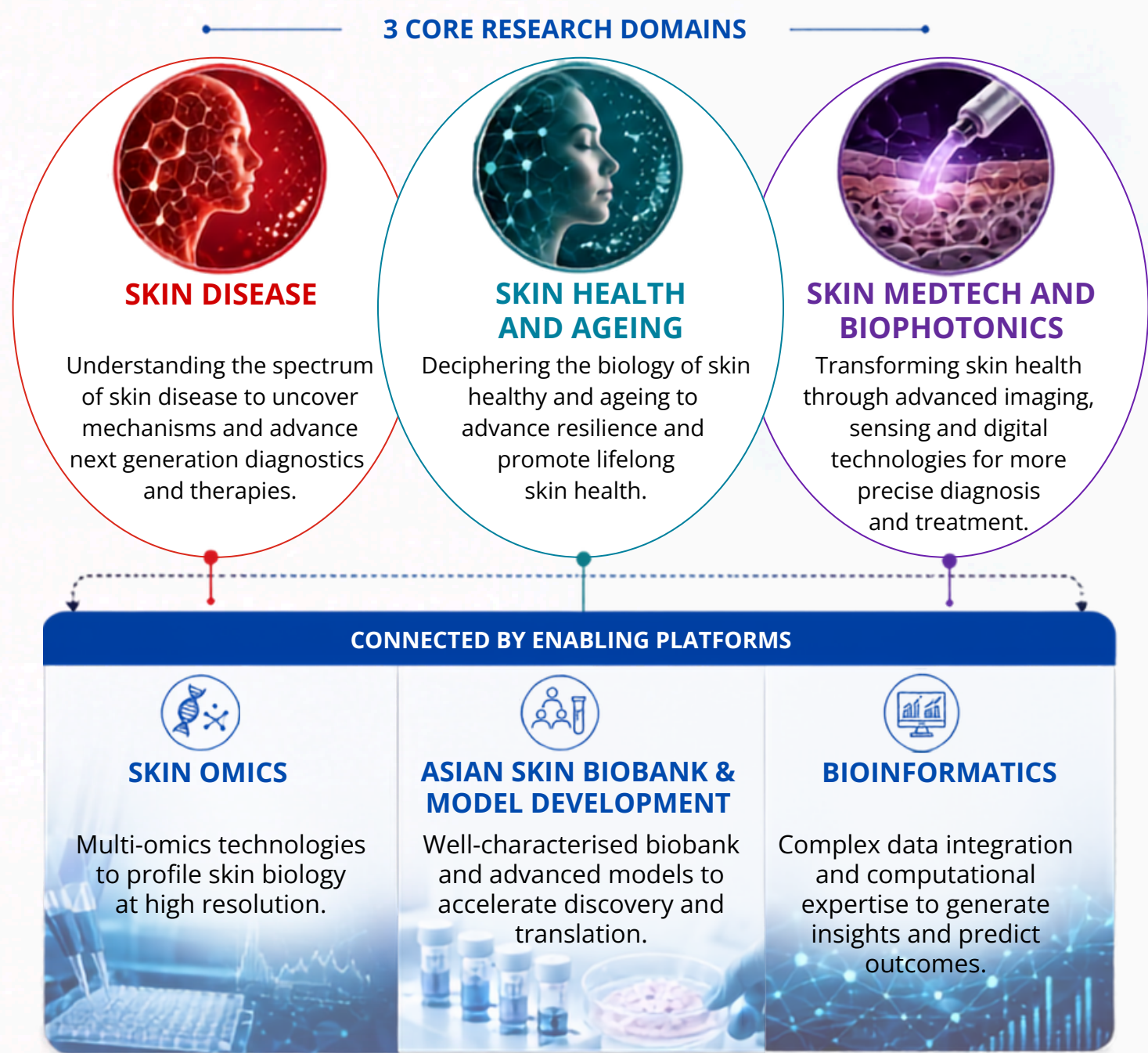
Clinical Translation

Clinical collaboration advances emerging technologies towards patient care, including non-invasive imaging for objective assessment and monitoring of clinical conditions, such as Atopic Dermatitis and Melasma.

Our Research Focus

Three Dimensions of Discovery, One Integrated Mission

A*STAR SRL’s research is organised around **three core domains** that work together to address the full spectrum of skin health, disease and innovation. Each domain brings together multi-disciplinary expertise to deepen understanding of skin biology, uncover disease mechanisms and develop new approaches to prevention, diagnosis and treatment.



These domains are strengthened by **cross-cutting enabling platforms** that provide advanced technologies, biological models, data capabilities and specialised resources. By supporting research from early discovery through validation and translation, these platforms help accelerate the development of clinically relevant insights, technologies and solutions for healthcare and industry.

Our Research Focus

Skin Disease

Uncovering Disease Mechanisms. Advancing Better Interventions.

The Skin Disease research domain investigates the biological, genetic, immune and environmental mechanisms that drive skin disorders. By combining fundamental skin biology with clinically relevant models and translational research, our scientists seek to identify new biomarkers, therapeutic targets and intervention strategies. Our work is deeply connected to clinical needs, with the goal of translating discoveries into meaningful outcomes for patients.



AREAS OF FOCUS

Inflammation & Immunology

Elucidating immune pathways and inflammatory mechanisms in conditions such as atopic dermatitis and allergy.

A cluster of various immune cells, including what look like lymphocytes and macrophages, rendered in shades of purple and blue.

Skin Barrier & Repair

Understanding barrier biology and identifying strategies to restore and strengthen skin integrity.

A 3D representation of the skin's surface, showing a grid of cells with small pores or openings, colored in warm tones of orange and red.

Genetic & Rare Skin Diseases

Investigating the genetic and molecular basis of rare and metabolic skin disorders to improve therapy.

A stylized illustration of a DNA double helix structure, with the sugar-phosphate backbone in red and the base pairs in white.

Scarring, Appendage Disorders & Cancer

Exploring mechanisms in fibrosis, acne, hair disorders and skin cancers to advance early detection and therapeutic development.

A cluster of cells, possibly representing a tumor or a group of cells involved in a skin condition, shown in various shades of red and orange.

RESEARCH LEADS

A portrait of Kenneth Lay, a man with short dark hair and glasses, wearing a grey blazer over a white shirt.

Kenneth Lay
Research Theme Lead Skin Disease

A portrait of John Common, a man with short blonde hair, wearing a light blue button-down shirt.

John Common
Senior Principal Investigator

A portrait of Anand Andiappan, a man with short dark hair, wearing a light blue button-down shirt.

Anand Andiappan
Principal Investigator

A portrait of Lee Yin Loon, a man with short dark hair and glasses, wearing a dark blue blazer over a light blue shirt.

Lee Yin Loon
Principal Investigator

A portrait of Nitya Ramkumar, a woman with dark hair, wearing a dark green blazer over a patterned top.

Nitya Ramkumar
Principal Investigator

A portrait of Koh Li Fang, a woman with long dark hair, wearing a blue patterned top.

Koh Li Fang
Principal Investigator

A portrait of Wong Xianrong, a man with short dark hair, wearing a dark blue blazer over a light blue shirt.

Wong Xianrong
Group Leader

SKIN DISEASE

Dr Kenneth Lay
Programme Lead (Skin Disease)

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding skin stem cell dynamics and
inflammatory pathways

Advancing mechanistic insights into epidermal & hair follicle stem cell
biology & innate immunity for inflammatory skin diseases

SCIENTIFIC LEADERSHIP

Dr Kenneth Lay, a National Research Foundation Fellow, leads the Skin Disease Programme, the Laboratory of Skin Stem Cell Dynamics and the Asian Skin Biobank and Model Development platform. A rising leader in skin stem cell biology, he investigates how hair follicle and epidermal stem cells self-renew, differentiate and communicate with their tissue environment during homeostasis, disease and ageing. His laboratory uses cell and molecular biology, disease modelling, omics and translational approaches to uncover new therapeutic pathways in inflammatory skin diseases.

RESEARCH FOCUS

Epidermal Stem Cell
Biology

Investigating epidermal stem cell regulation and its cross-talk with the immune system to maintain skin barrier homeostasis.

Hair Follicle
Dynamics

Identifying physiological signals that regulate hair cycling and uncovering mechanisms safeguarding stem cell function in hair.

Innate
Immunity

Translating mechanistic insights of innate immunity pathways into therapeutics for auto-inflammatory skin diseases.

CORE CAPABILITIES



Stem cell lineage tracing & clonal behaviour



Epidermal biology



Hair follicle dynamics



Skin/hair organoid & organotypic models



Skin-immune cell crosstalk



Immune sensors regulation



Epigenetic regulation



Therapeutics discovery

COLLABORATIONS



Dr Lay's lab welcomes collaborations in skin and hair stem cell biology, inflammatory skin diseases, innate immunity, hair follicle biology, genetic disease modelling and translational therapeutic development.

RESEARCH THEMES

Epidermal Stem Cell Biology

Hair Follicle Stem Cell Niche

Inflammatory Skin Diseases

Genetic Skin Diseases

Innate Immunity

Model Development

Drug Development

SKIN DISEASE

Prof. John Common

Senior Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)
Newcastle University

Understanding skin barrier, immunity
and microbial interactions

Uncovering the molecular and microbial factors that influence skin
barrier function, inflammation and disease

SCIENTIFIC LEADERSHIP

Professor John Common focuses on skin biology and barrier function and the mechanisms underlying inflammatory skin diseases. He investigates the molecular basis and immunopathology of conditions including acne and ichthyosis, with particular interest in identifying disease mechanisms and novel biomarkers. His work explores interactions between the skin, microbiome and environment to understand how microbes and external stimuli can influence barrier function and immune responses. By integrating skin genetics, molecular biology and microbiome research, he seeks to advance understanding of skin health and disease and identify new opportunities for intervention.

RESEARCH FOCUS

Skin Microbiome &
Health

Exploring host-microbiome and
host-environment interactions
to understand their influence on
skin barrier function, immunity
and skin diseases such as acne.

Atopic
Dermatitis

Studying the molecular
mechanisms, immunopathology
and biomarkers underlying
atopic dermatitis to better
understand disease
development and severity.

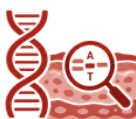
Skin
Barrier

Investigating the molecular
mechanisms regulating skin
barrier function and
dysfunction, including
ichthyosis, to identify strategies
to restore skin integrity.

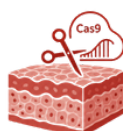
CORE CAPABILITIES



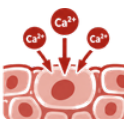
Skin microbiome
studies



Skin genetics and
filaggrin mutation
screening



CRISPR-Cas9
knockout 3D skin
models



Calcium influx and
functional studies



Skin microbe strain
library



Skin explant and
mouse models

COLLABORATIONS



Prof.Common's lab welcomes collaborations to explore microbial and host
biomarkers, understand variations in skin across populations and life stages, and
evaluate approaches aimed at supporting a healthy skin microbiome.



RESEARCH THEMES

Skin Inflammation

Atopic Dermatitis

Skin Genetics

Skin Barrier

Immunology

Population Skin Research

SKIN DISEASE

Dr Anand Kumar
Andiappan

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Translating immunology for skin health
and inflammatory diseases

Advancing precision approaches to skin health and inflammatory
diseases through immune profiling and molecular endotyping

SCIENTIFIC LEADERSHIP

Dr Anand Andiappan is a translational immunologist whose research focuses on uncovering the molecular mechanisms underlying allergies and immune dysregulation, with a strong emphasis on Asian populations. His work has identified population-level differences in the immune biology of skin health and inflammatory diseases, including atopic dermatitis, allergic rhinitis and acne. By integrating clinical phenotyping with molecular endotyping and immune profiling, his research aims to reveal disease mechanisms that can support earlier diagnosis, improved treatment selection and more personalised approaches to patient care.

RESEARCH FOCUS

Molecular Endotypes of
Atopic Dermatitis

Characterising blood and skin samples to identify immunological differences underlying clinically similar forms of atopic dermatitis and inform more targeted treatment strategies.

Allergy and Immune
Dysregulation

Investigating the molecular and cellular pathways that drive allergic disease, including differences in immune responses, allergen exposure and treatment response across patient populations.

Precision Immunology
for Asian Populations

Defining population-specific immune signatures and biomarkers to improve disease stratification, early diagnosis and personalised therapeutic approaches for allergic and inflammatory conditions.

CORE CAPABILITIES



Translational
immunology



Atopic
dermatitis
research



Molecular
phenotyping &
immune profiling



Skin-immune
interactions



Precision
medicine
approaches



Allergy
biomarker
discovery



Clinical
phenotype to
endotype studies



Inflammaging
and skin health

COLLABORATIONS



Dr Andiappan's lab welcomes collaborations in biomarker discovery, patient stratification and therapeutic response, using clinical cohorts and advanced immune profiling to develop more precise approaches for allergic and inflammatory diseases.



RESEARCH THEMES

Acne

Atopic Dermatitis

Ageing and Systemic Inflammation

Personalised Treatment Strategies

Molecular Endotyping

Precision Immunology

Asian Population Health

Biomarkers for Allergies

SKIN DISEASE

Dr Lee Yin Loon

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding nuclear mechanotransduction
in disease

Uncovering how nucleus-cytoskeleton coupling shapes cellular
responses, tissue homeostasis, and disease

SCIENTIFIC LEADERSHIP

Dr Lee Yin Loon’s research focuses on the mechanisms through which cells sense and respond to mechanical forces. His group investigates how the nucleus communicates with the cytoskeleton, with an emphasis on Linker of Nucleoskeleton and Cytoskeleton (LINC) complexes and other nuclear envelope proteins. By studying how mechanotransducing proteins regulate cellular behaviour, tissue homeostasis and disease, his research seeks to uncover mechanisms underlying mechanosensitive pathologies, including fibrotic and degenerative conditions.

RESEARCH FOCUS

Nucleus - Cytoskeleton
Interactions

Investigating how cells sense and transmit mechanical forces via interactions of the cytoskeleton with the nucleus and nucleoskeleton and how these interactions influence cellular behaviour and tissue function.

Mechanobiology and
Disease

Defining how disrupted cellular mechanotransduction contributes to disease, including fibrosis and other degenerative pathologies.

Mechano-
medicine

Developing novel therapeutics based on understanding mechanosensitive disease mechanisms.

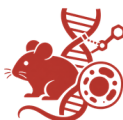
CORE CAPABILITIES



BioID proximity labelling
proteomics



Skin and liver fibrosis
models



Mouse and mammalian
cell genetics



Super-resolution and
live cell microscopy



Target discovery



Gene therapy

COLLABORATIONS



Dr Lee’s lab welcomes collaborations in mechanobiology, fibrosis, tissue scarring and the application of proximity labelling proteomics, to uncover mechano-transduction-driven disease pathways, investigate changes in nuclear mechanics and identify new targets for fibrotic and other diseases.



RESEARCH THEMES

Fibrosis

Gene therapy

Nucleus-Cytoskeleton Interactions

Mechanobiology of Disease

SKIN DISEASE

Dr Nitya Ramkumar
Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding the dynamics of skin
regeneration

Uncovering the cellular, molecular and mechanical principles that
drive skin regeneration to inform future approaches for restoring
damaged and diseased skin

SCIENTIFIC LEADERSHIP

Dr Nitya Ramkumar leads the Regeneration Dynamics Laboratory, where her research focuses on uncovering how skin rebuilds and restores itself after injury. Using zebrafish as a live vertebrate model, her laboratory visualises regeneration in real time to understand how cellular behaviours, molecular signalling and mechanical forces coordinate tissue repair. By integrating genetics, quantitative live imaging and regenerative biology, her research seeks to uncover the principles that drive successful skin regeneration and generate insights that may inform future strategies for restoring damaged or diseased skin.

RESEARCH FOCUS

Skin Regeneration
Biology

Understanding how skin restores
its structure and function by
uncovering the cellular and
molecular mechanisms that
coordinate tissue repair, renewal
and regeneration.

Cellular and Mechanical
Dynamics

Investigating how cellular
behaviours, molecular signalling
and mechanical forces work
together to drive skin
regeneration and tissue
remodelling.

Live Models of
Skin Repair

Developing quantitative
zebrafish models and advanced
live imaging approaches to
visualise and analyse skin and
appendage regeneration in real
time within living tissues.

CORE CAPABILITIES



Zebrafish genetic models



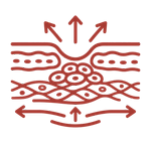
Transgenic and genome
engineering



Cellular dynamics and
image analysis



Skin and appendage
regeneration



Mechanobiology of
tissue regeneration



Quantitative live
confocal imaging

COLLABORATIONS



Dr Ramkumar's lab welcomes collaborations in skin regeneration and tissue repair. They provide unique in vivo platforms to investigate appendage regeneration, skin barrier dysfunction and wound healing, generating mechanistic insights that may inform future approaches to restoring skin function.

RESEARCH THEMES

Skin Regeneration Biology

Live Imaging of Disease & Tissue Dynamics

Zebrafish Models for Disease & Regeneration

Quantitative Regenerative Morphogenesis

Regenerative Medicine & Tissue Repair

Mechanobiology

SKIN DISEASE

Dr Koh Li Fang

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding shared mechanisms in
inflammatory skin disease

Uncovering common and disease-specific pathways to guide more
effective treatments for inflammatory skin conditions

SCIENTIFIC LEADERSHIP

Dr Koh Li Fang's research focuses on understanding the molecular and cellular mechanisms that drive inflammatory skin diseases, with particular emphasis on atopic dermatitis. Her work examines how disruptions in epidermal biology, immune signalling and the skin microenvironment contribute to disease development and persistence. By identifying mechanisms shared across conditions such as eczema, hidradenitis suppurativa and psoriasis, while also defining the features that distinguish individual diseases, her research aims to reveal therapeutic opportunities relevant across multiple inflammatory skin disorders.

RESEARCH FOCUS

Inflammatory Skin
Disease
Mechanisms

Investigating shared and
disease-specific molecular
pathways that contribute to
inflammatory skin conditions
and shape differences in disease
presentation and progression.

Epidermal
Dysfunction and
Atopic Dermatitis

Studying how altered epidermal
proteins, barrier dysfunction and
inflammatory signalling
contribute to atopic dermatitis
and related dermatitis
conditions.

Skin Microenvironment
and Therapeutic
Discovery

Examining interactions between
the epidermis and immune
system to identify disease
mechanisms, therapeutic targets
and translational opportunities
for inflammatory skin diseases.

CORE CAPABILITIES



Inflammatory skin
disease modelling



Advanced skin tissue &
histological analysis



Biomarker discovery &
disease stratification



Skin Barrier biology &
functional assessment



Cellular & molecular
mechanism studies



Skin inflammation
mouse models

COLLABORATIONS



Dr Koh's lab welcomes collaborations aimed at understanding the biological mechanisms of inflammatory skin diseases, investigating disease-associated pathways, examining the roles of epidermal and microbial factors and advancing new therapeutic strategies using cellular, tissue and preclinical models.



RESEARCH THEMES

Inflammatory Skin Disease

Atopic Dermatitis

Epidermal Dysfunction

Skin Barrier Biology

Cell Signalling

SKIN DISEASE

Dr Wong Xianrong
Group Leader

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding mechanical signals in skin
health and disease

Deciphering how mechanical stress intersects with cellular signalling
and intercellular communication to drive tissue dysfunction and
reveal new therapeutic strategies

SCIENTIFIC LEADERSHIP

Dr Wong Xianrong co-leads the Laboratory of Cell and Tissue Mechanosignalling at A*STAR Skin Research Labs. With training in engineering, molecular and cell biology, he brings a multidisciplinary approach to understanding how cells sense, integrate and communicate signals within tissues. His research examines how mechanical and biochemical cues, cytoskeletal and nuclear organisation and intercellular communication collectively shape cell behaviour in health and disease. By combining cell biology, emerging technologies and disease models, he seeks to uncover disease mechanisms and translate them into therapeutic strategies.

RESEARCH FOCUS

Cellular Mechanobiology
and Disease

Investigating how cells sense and respond to mechanical cues and changes in the tissue microenvironment, and how dysregulation of these responses contributes to tissue dysfunction and disease.

Cell-cell and Inter-tissue
Communication

Understanding how cells and tissues communicate to coordinate physiological function and how these are remodelled in disease. Developing approaches to map molecular communication in complex biological systems.

Disease Mechanisms and
Therapeutic Discovery

Identifying maladaptive cellular processes in disease and targeting them to restore tissue function, with a focus on mechanisms shared across skin, adipose and other tissues.

CORE CAPABILITIES



Cell and tissue
mechanobiology



Cell-cell
communication
mapping



Nuclear lamina
and genome
organisation



Adipocyte
differentiation
and function



Mammalian
cell and mouse
genetics



Cell imaging and
quantitative
analysis



Proximity-
labelling
proteomics



Gene therapy
and target
validation

COLLABORATIONS



Dr Wong's lab welcomes collaborations in mapping cell-cell and inter-tissue communication, developing proximity-labelling technologies to resolve molecular interactions, investigating how biochemical and mechanical environments regulate cell behaviour, developing disease-relevant models and identifying new targets.

RESEARCH THEMES

Mechanobiology of Disease

Adipose & Metabolic Disease

Fibrosis & Tissue Remodelling

Cell-Cell & Tissue Communication

Cell & Tissue Mechanosignalling

Gene & Molecular Therapies

Cell Fate & Genome Regulation

Nuclear Organisation & Signalling

Our Research Focus

Skin Health and Ageing

Advancing Skin Resilience, Longevity and Healthy Ageing.

The Skin Health and Ageing domain aims to define functional and molecular hallmarks of skin health, understand mechanisms that initiate ageing with a particular focus on Asian skin, and translate biological insights into interventions, active ingredients and solutions that support healthier skin. Through collaboration across A*STAR SRL's research themes, the domain integrates fundamental biology, skin and hair models and translational science to promote skin health in Asia and beyond.



AREAS OF FOCUS

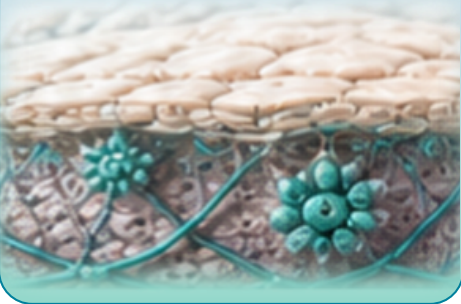
Host-Microbe Interaction

Investigating the complex interactions between skin microbes and the host, and how microbial communities influence skin barrier function, resilience and health.



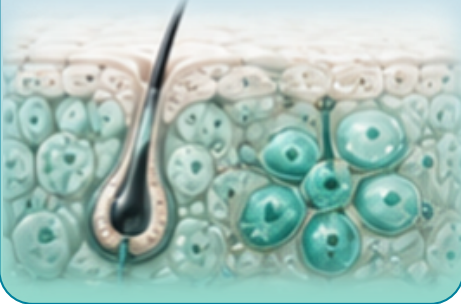
Senescence and Ageing

Investigating the role of senescent cells in skin ageing, inflammation and impaired repair, and identifying strategies to restore skin resilience and health.



Hair and Skin Pigmentation

Investigating the molecular mechanisms regulating hair growth and skin pigmentation to identify new targets and interventions for pigment and scalp disorders.



Skin Health and Physiology

Investigating the molecular and physiological features of skin ageing in living participants to evaluate interventions, treatments and lifestyle factors that support skin health.



RESEARCH LEADS



Oliver Dreesen
Research Theme Lead



Rachel Watson
Executive Director



Leah Vardy
Research Director



Viduthalai R. Regina
Senior Principal Investigator



Carlos Clavel
Principal Investigator



Giulia Adriani
Principal Investigator



James Chan
Principal Investigator



Mun Juinn Chow
Group Leader



Cheryl Leong
Group Leader

SKIN HEALTH & AGEING

Dr Oliver Dreesen
Deputy Executive Director
Programme Lead (Skin Health & Ageing)

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding cellular senescence & premature ageing to enable targeted interventions

Advancing mechanistic insights and translational strategies for skin ageing and senescence

SCIENTIFIC LEADERSHIP

Dr Oliver Dreesen is Deputy Executive Director of A*STAR SRL and SRIS and the Programme Lead for Skin Health & Ageing. He is an established ageing biology researcher whose work bridges cellular mechanisms, disease models and translational skin science. He leads research efforts that strengthen A*STAR SRL’s capabilities in skin health, ageing and senescence biology, with a focus on building clinically relevant insights, biomarkers and intervention strategies for age-associated skin conditions.

RESEARCH FOCUS

Cellular Senescence Mechanisms

Investigating fundamental mechanisms of human ageing & cellular senescence including pathways that drive age-related cellular dysfunction.

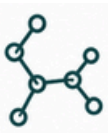
Premature Ageing Syndrome

Using Hutchinson-Gilford Progeria Syndrome as an ageing model to study nuclear architecture, chromatin organisation, DNA replication and telomere integrity.

Translational Seno-therapeutics

Developing senolytics and senomorphics and advancing biomarker discovery for detection, quantification and interventions for senescent cells.

CORE CAPABILITIES



Senescence biomarkers for age-related skin conditions



DNA damage & chromatin biology



Live cell senescence studies



Cellular ageing models



Senolytics & senomorphics

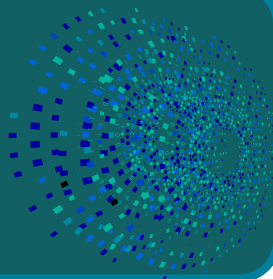


Molecular functions of nuclear lamina in senescence & premature ageing syndromes

COLLABORATIONS



Dr Dreesen’s lab welcomes collaborations in cellular senescence, premature ageing mechanisms, nuclear architecture, chromatin biology, senescence biomarker development and translational strategies for modulating senescent cells.



RESEARCH THEMES

Skin Ageing

Cellular Senescence

Senescence Biomarkers

Nuclear Lamina

Premature Ageing Syndromes

Chromatin

Senolytics & Senomorphics

SKIN HEALTH & AGEING

Prof. Rachel Watson

Executive Director

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding the biology of skin ageing to
enable targeted interventions

Advancing Asian-relevant skin ageing research with global
translational impact

SCIENTIFIC LEADERSHIP

Professor Rachel Watson is the Executive Director of A*STAR SRL and SRIS. Her work centres around the biological mechanisms of intrinsic and extrinsic skin ageing, with a particular focus on Asian skin phenotypes. She integrates skin biology, clinical studies and molecular profiling to support the development of evidence-based strategies for skin health, repair and ageing intervention. Her research also seeks to translate mechanistic insights into clinically relevant approaches that improve the assessment, prevention and management of age-related skin changes.

RESEARCH FOCUS

Skin Ageing
Mechanisms

Investigating tissue remodelling, extracellular matrix disruption, inflammation and repair processes contributing to ageing-related skin changes.

Asian Skin
Phenotypes

Addressing knowledge gaps in how Asian skin ages across diverse populations, environments and biological contexts.

Translational
Validation

Using proof-of-principle clinical studies and molecular readouts to evaluate emerging preventive, cosmetic and therapeutic approaches.

CORE CAPABILITIES



In vivo skin
physiology
assessment



Proof-of-
principle clinical
studies



Gene expression
profiling



Single-cell &
spatial
transcriptomics



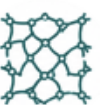
Immuno-
histochemistry



Protein
biochemistry



Matrix
metalloproteinase
analysis

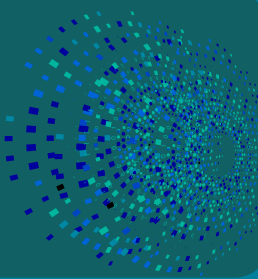


ECM remodelling
studies

COLLABORATIONS



Professor Watson's lab welcomes collaborations in skin ageing biology, Asian skin phenotype studies, extracellular matrix repair, inflammation-driven ageing pathways, biomarker identification and discovery of novel interventions for skin health and ageing.



RESEARCH THEMES

Skin Ageing

Extracellular Matrix Repair

Dermal-Epidermal Junction

Photodamage

Skin Ethnicity

Skin Physiology/Structure

Pigmentation

Fibrillin-rich microfibrils

Asian Skin

SKIN HEALTH & AGEING

Dr Leah Vardy

Research Director

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Targeting novel pathways in skin health,
repair and disease

Uncovering new treatment strategies for skin health, repair and
disease by targeting polyamine biology and cell regulation

SCIENTIFIC LEADERSHIP

Dr Leah Vardy is a senior researcher who has spent over two decades in biomedical research, with the last ten years dedicated to understanding the biology of skin. Her research is rooted in cell and molecular biology, with a strong emphasis on uncovering the molecular mechanisms driving skin pathologies. Her team has linked abnormal polyamine levels with pigmentation disorders, impaired wound healing and skin barrier dysfunction, opening new opportunities to explore how restoring polyamine balance could support healthier skin.

RESEARCH FOCUS

Pigmentation and Skin
Barrier Function

Understanding the pathways driving epidermal pigmentation, barrier maintenance, and homeostasis to develop novel strategies for restoring barrier integrity and correcting pigmentation disorders.

Tissue Repair and
Healing

Understanding the molecular and gene-expression changes driving epidermal re-epithelialisation and tissue repair to identify therapeutic targets for accelerating wound closure and skin restoration.

Polyamines and Gene
Regulation

Investigating how polyamines control skin homeostasis, cellular behaviour, and disease phenotypes to leverage polyamine metabolic pathways for novel therapeutic and cosmetic interventions.

CORE CAPABILITIES



Human ex vivo skin and
disease models



Re-epithelialization
and tissue repair
models



Polyamine biology &
metabolic profiling



Pigmentation / melanin
transfer assays



Epidermal biology &
gene expression
analysis

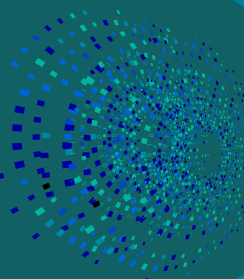


Post-transcriptional
regulation

COLLABORATIONS



Dr Vardy's lab welcomes collaborations in polyamine biology and the molecular regulation of skin health and disease, with opportunities to translate mechanistic insights into new approaches for skin pathologies, barrier restoration and healthy skin ageing.



RESEARCH THEMES

Skin Ageing

Skin Barrier & Repair

Pigmentation

Polyamine Biology

Epidermal Biology

SKIN HEALTH & AGEING

Dr Viduthalai Rasheedkhan Regina

Senior Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding the skin microbiome for skin health and disease

Understanding the complex relationships between skin microbes and their human host to uncover new approaches for maintaining skin health and treating disease.

SCIENTIFIC LEADERSHIP

Dr Viduthalai Rasheedkhan Regina leads the Host-Microbiota Ecology (HoME) Lab, where his research focuses on understanding the ecological and functional relationships between the skin microbiota and its human host. His team combines biofilm biology, multi-omics, microbial ecology, computational biology and experimental model systems to investigate how microbial communities assemble, interact and influence skin health and disease. By uncovering mechanisms of host-microbiota and microbe-microbe interactions, his research aims to enable microbiota-driven approaches for more targeted and precise interventions in skin conditions.

RESEARCH FOCUS

Host-Microbiota & Microbial Interactions

Investigating how skin microbes interact with one another and with their human host, and how these relationships influence microbial community structure, function and skin health.

Microbial Community Engineering

Building defined multispecies biofilm communities to examine the mechanisms and metabolic cross-talk that drive microbial community assembly and function.

Microbiota-Driven Precision Therapies

Exploring how skin microbiota can be employed or modulated to develop innovative, precise approaches for treating skin conditions, including inflammatory diseases and infections.

CORE CAPABILITIES



Skin microbiome analysis



Multi-omics approaches



Synthetic microbial communities



Microbial ecology & community engineering



Computational biology



Ecological modelling



Clinical studies

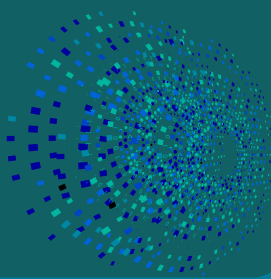


Host-microbiota interaction studies

COLLABORATIONS



Dr Regina’s lab welcomes collaborations aimed at understanding microbial dysbiosis, developing microbiota-targeted interventions and advancing precision approaches for improving skin health and treating disease.



RESEARCH THEMES

Skin Microbiome & Host Interactions

Microbial Dysbiosis in Skin

Inflammatory Skin Conditions

Asian Skin Microbiome

Microbiota Driven Precision Therapies

Wound Biofilm Infections

Microbiota Colonisation Resistance Against Pathogens

SKIN HEALTH & AGEING

Dr Carlos Clavel

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Unlocking the biology of hair and
pigmentation

Understanding hair follicle stem cell niches and pigmentation to
uncover new approaches for skin and hair disorders.

SCIENTIFIC LEADERSHIP

Dr. Carlos Clavel's research focuses on understanding the cellular and molecular mechanisms that regulate the hair follicle stem cell niche and skin and hair pigmentation. His work investigates how specialised cells within the hair follicle control hair growth, regeneration and pigment production, and how disruption of these processes contributes to skin and hair disorders. By developing advanced experimental models to study interactions within the hair follicle and pigmentation niches, his research seeks to translate fundamental insights in stem cell and developmental biology into new therapeutic opportunities.

RESEARCH FOCUS

Hair Follicle
Biology

Investigating the cellular and
molecular mechanisms that
regulate hair follicle
development, growth and
regeneration.

Stem Cell
Niches

Understanding how specialised
cellular environments regulate
hair follicle and melanocyte stem
cells during normal development
and disease.

Hair and Skin
Pigmentation

Studying the intrinsic and
environmental factors that
regulate pigment production
and transfer in hair follicles and
skin.

CORE CAPABILITIES



Hair follicle, stem cell
and melanocyte biology
studies



Hair loss / alopecia-
related studies



Melanocyte-
keratinocyte interaction
studies



Vitiligo / skin
depigmentation
models



Single-cell and spatial
transcriptomics
(Stereo-seq)

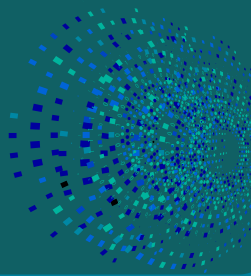


Cell migration and
pigmentation assays

COLLABORATIONS



Dr Clavel's lab welcomes collaborations to study hair and pigmentation biology, evaluate the effects of environmental and biological factors, develop advanced experimental models and explore new approaches for addressing skin and hair-related conditions.



RESEARCH THEMES

Melanocyte Biology

Dermal Papilla Biology

Hair & Skin Pigmentation

Stem Cell Niches

Pigment Production & Transfer

Hair Follicle Biology

Hair Growth & Regeneration

SKIN HEALTH & AGEING

Dr Giulia Adriani

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Engineering next-generation human tissue models to understand skin health & disease

Recreating complex biological environments through advanced vascularised and immune-competent human tissue models using organ-on-chip technologies

SCIENTIFIC LEADERSHIP

Dr Giulia Adriani leads research at the interface of biomedical engineering, immunology and vascular biology, focusing on human microphysiological systems (MPS) that closely reproduce human biology. She applies microfluidic technologies to create vascularised, three-dimensional multicellular systems that enable study of interactions between tissue, vascular and immune components under physiological and disease-mimicking conditions. Her work aims to improve understanding of tissue biology, ageing and disease mechanisms, while providing predictive human-relevant models for preclinical evaluation of therapeutic interventions.

RESEARCH FOCUS

Advanced Human Tissue Models

Developing 3D multicellular systems to recreate structural, molecular and functional features of human tissues to investigate tissue biology, disease mechanisms and responses to therapeutic interventions.

Vascularised & Immune-Competent Models

Engineering MPSs with perfusable vascular networks and integrated immune components to study complex cell-cell interactions, inflammation and tissue remodelling in controlled microenvironments.

Organ-on-Chip Platforms with Neural Components

Designing microfluidic systems that include neural elements to investigate neurovascular and neuroimmune interactions in health and disease.

CORE CAPABILITIES



MPS & Organ-on-a-Chip technologies



Advanced 3D multicellular human tissue model development



Immune-competent human models & immune cell assays



Vascularised & perfusable tissue engineering



Preclinical therapeutic evaluation

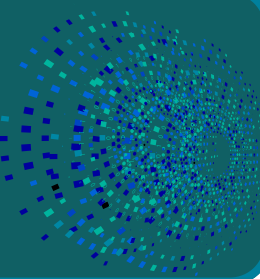


Cell-cell & tissue microenvironment characterisation

COLLABORATIONS



Dr Adriani's lab welcomes collaborations in biomedical engineering, microfluidics and advanced human tissue modelling to develop customised human-relevant MPSs, investigate vascular-immune-tissue interactions and evaluate therapeutics in translationally relevant platforms.



RESEARCH THEMES

Advanced Human Tissue Models

Microphysiological Systems

Immune-Competent Tissue Systems

Tissue Microenvironment and Cell-Cell Crosstalk

Vascularised 3D Models

Human-Relevant Disease Modelling

SKIN HEALTH & AGEING

Dr James Chan

Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding the chemical biology of the skin

Combining metabolomics, microbiome science and chemical biology to reveal how small molecules shape skin health and to translate these insights into next-generation skin interventions

SCIENTIFIC LEADERSHIP

Dr James Chan is a Principal Investigator at A*STAR Skin Research Labs, where his research explores the chemical biology of the skin. His group studies how small molecules, produced by the skin itself, by its resident microbes and the wider body, communicate with skin cells to influence skin physiology, barrier function and ageing. By integrating advanced mass spectrometry (MS)-based metabolomics with medicinal chemistry and computational modelling, his team uncovers the biological pathways and functionally relevant metabolites that govern skin biology and harnesses them to design new approaches for maintaining and improving skin health.

RESEARCH FOCUS

Skin Metabolomics and Biomarker Discovery

Applying targeted, untargeted and spatial metabolomics to map the small-molecule landscape of skin, and to identify biomarkers and biological pathways associated with skin barrier, ageing and pigmentation.

Microbial-Host Communication

Using stable-isotope labelling and chemical biology tools to trace metabolites exchanged between microbes and skin and to understand how signals from skin microbiome and the wider body shape skin biology and function.

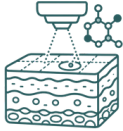
Chemical Biology and Therapeutic Discovery

Integrating medicinal chemistry, structure-activity relationship (SAR) studies and functional screening to discover and optimise bioactive molecules for skin applications.

CORE CAPABILITIES



Targeted & untargeted MS metabolomics



Spatial metabolomics imaging



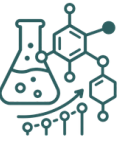
Microbial and host metabolite profiling



Host-microbe interaction studies



Stable-isotope and metabolite tracing



Medicinal chemistry & SAR studies



Transdermal penetration and PBPK modelling



Structural elucidation of small molecules

COLLABORATIONS



Dr Chan's group welcomes collaborations in biomarker discovery, microbiome and metabolomics research and bioactive development. They collaborate with academic and industry partners to uncover molecular drivers of skin biology, characterise microbiome-derived mechanisms and discover and optimise bioactives for skin health.

RESEARCH THEMES

Skin Barrier, Ageing & Pigmentation

Microbial - Host Skin Communication

Gut-Skin Axis

Bioactive & Therapeutic Discovery

Transdermal Penetration & Physiologically Based Pharmacokinetic (PBPK) Modelling

Skin Metabolomics & Spatial Imaging

SKIN HEALTH & AGEING

Dr Mun Juinn Chow
Group Leader

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Targeting Hair Follicle Metabolism to
Modulate Hair Growth and Shedding

Discovering metabolic pathways and bioactive compounds that
regulate hair growth, shedding and regeneration

SCIENTIFIC LEADERSHIP

Dr Mun Juinn Chow is a Group Leader at A*STAR Skin Research Labs. His research focuses on understanding and manipulating the metabolic pathways that regulate human hair follicle activity. By identifying metabolic drivers of hair growth and shedding and translating these insights into active discovery, his work aims to develop scientifically grounded approaches for managing unwanted hair growth, hair thinning and age-related changes in hair health. Several actives identified through this research are progressing through further evaluation and development.

RESEARCH FOCUS

Hair Follicle
Metabolism

Investigating the metabolic pathways and energy requirements that govern hair follicle activity, growth and regression.

Metabolic Target &
Active Discovery

Identifying and evaluating metabolic targets and active compounds that can promote or reduce hair growth for different hair and scalp applications.

Translational Hair
Biology

Advancing mechanistic findings through human-relevant models and preclinical studies to support the development of effective hair-health solutions.

CORE CAPABILITIES



Hair follicle
metabolism
studies



Human hair
follicle models -
Growth &
Shedding



Hair metabolic
pathway analysis



Active compound
screening



Hair follicle-
derived
keratinocyte
models



Molecular and
biochemical
profiling



Mechanism-of-
action studies



Translational
efficacy
evaluation

COLLABORATIONS



Dr Chow's lab welcomes collaborations in understanding the metabolic regulation of hair follicles and translating the insights into interventions for hair growth, reduction and age-related hair changes. They offer capabilities spanning target identification, active screening and mechanism-of-action studies using human-relevant hair models.

RESEARCH THEMES

Hair Follicle Metabolism

Hair Growth Regulation

Hair-Reduction Actives

Anti-Hair Fall Actives

Age-Related Hair Thinning

Metabolic Target Discovery

Translational Hair Science

SKIN HEALTH & AGEING

Dr Cheryl Leong
Group Leader

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding skin fungi for healthier skin

Understanding Malassezia biology and antifungal resistance to
improve the management of fungal skin conditions

SCIENTIFIC LEADERSHIP

Dr Cheryl Leong is a Group Leader at A*STAR Skin Research Labs, where she studies human skin fungal pathogens and translates fundamental discoveries into approaches that support skin health. Her research focuses on Malassezia, the dominant fungal genus on human skin, and examines how fungal diversity, pathogenicity and treatment exposure influence skin conditions and antifungal response. By combining fungal biology, microbiology and translational research, her work aims to address recurrent infections and emerging antifungal resistance.

RESEARCH FOCUS

Skin Fungal Biology &
Diversity

Investigating the diversity, behaviour and disease associations of skin-resident fungi, with a particular focus on Malassezia species in healthy and affected skin.

Antifungal Susceptibility
and Resistance

Developing and applying antifungal susceptibility methods to identify resistance patterns and understand the molecular mechanisms that reduce treatment effectiveness.

Translational
Antifungal Strategies

Using insights from fungal biology and drug response to inform improved treatment approaches and the development of interventions for Malassezia-associated skin conditions.

CORE CAPABILITIES



Malassezia culture and characterisation



Antifungal susceptibility testing



Fungal genomics and molecular analysis



Drug-resistance mechanism studies



Skin mycobiome profiling



Clinical and commensal isolate studies



In vitro antifungal exposure models

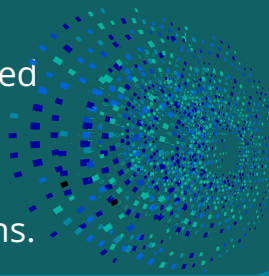


Translational fungal research

COLLABORATIONS



Dr Leong's lab welcomes collaborations in skin fungal biology, Malassezia-associated conditions, antifungal resistance and new antifungal or microbiome-targeted strategies. They offer expertise in fungal culture, molecular analysis and isolate studies to support therapeutic discovery and management of fungal skin conditions.



RESEARCH THEMES

Skin Fungal Pathogens

Malassezia Biology

Skin Mycobiome

Antifungal Resistance

Drug Susceptibility

Fungal-Host Interactions

Recurrent Fungal Conditions

Translational Skin Health

Our Research Focus

Skin MedTech and Biophotonics

Advanced Technologies. Transforming Skin Insights.

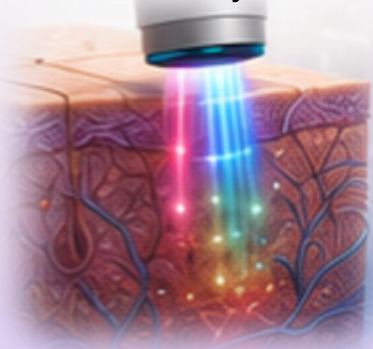
The Skin MedTech and Biophotonics domain develops advanced optical, imaging, sensing and computational technologies to better understand, assess and monitor skin health and disease. Combining biophotonics, wearable systems, biosensing, nanophotonics and digital modelling enables non-invasive, quantitative and clinically relevant insights into skin structure, function and biochemical activity. These technologies support earlier detection, more precise diagnostics, treatment evaluation and personalised interventions. By translating scientific innovation into practical tools for clinics, research laboratories and consumer settings, the group is helping transform how skin conditions are measured, monitored and managed.



AREAS OF FOCUS

Non-invasive Optical and Multimodal Imaging

Developing biophotonics, photoacoustic imaging and ultrasound technologies to visualise skin structure, function and biochemical activity.



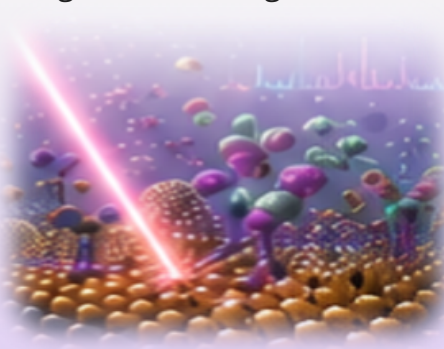
Wearable and Point-of-Care Technologies

Enabling continuous, real-time monitoring of skin and vascular health beyond the clinic. Supporting home-based care, longitudinal assessment and population-scale applications.



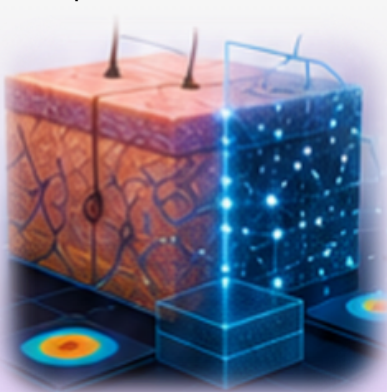
Advanced Biosensing and Nanophotonics

Enabling sensitive detection of molecular and biochemical markers. Supporting disease stratification, therapeutic evaluation and next-generation diagnostics.



Digital and Optical Twins of Skin

Generating digital representations of skin through biophysical modelling, artificial intelligence and optical simulation



RESEARCH LEADS



Dinish U.S.
Research Theme Lead



Malini Olivo
Distinguished Principal Investigator



Renzhe Bi
Principal Investigator



SKIN MEDTECH & BIOPHOTONICS

Assoc Prof. Dinish U. S.
Programme Lead (Skin MedTech and Biophotonics)

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)
Assoc Prof (Adj), School of Physical & Mathematical Sciences, NTU

Advancing non-invasive biophotonics technologies for clinical translation and patient care

Developing non-invasive optical platforms and imaging tools to support clinical assessment and management

SCIENTIFIC LEADERSHIP

Associate Professor Dinish U.S. is the Programme Lead for the Skin MedTech and Biophotonics theme at A*STAR SRL, working at the convergence of biophotonics, engineering and translational medicine. His research is focused on creating practical MedTech solutions that enhance skin diagnostics, track disease progression and objectively assess treatment response. By combining device innovation, quantitative analysis and clinical validation, his work seeks to deliver precise, accessible and patient-centred technologies for dermatology and broader healthcare applications.

RESEARCH FOCUS

Biophotonics Imaging & Spectroscopy Platforms

Developing high-resolution, non-invasive optical imaging and spectroscopy tools to assess skin structure, vasculature, biochemical signatures and physiological function in near real time.

Biomarker Sensing Platform

Designing and developing advanced biosensing platforms for sensitive detection of specific biomarkers and metabolites.

Translational MedTech Development

Building clinically relevant devices and workflows to support objective diagnosis, longitudinal assessment and evaluation of therapeutic response.

CORE CAPABILITIES



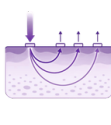
Raman & surface-enhanced Raman spectroscopy



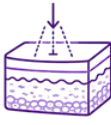
Photoacoustic imaging



Handheld device prototyping



Diffuse reflectance and fluorescence spectroscopy



Skin optical phantoms



Biomarker-guided diagnostics



Clinical translation studies



AI-enabled image analysis & quantification

COLLABORATIONS



Associate Professor Dinish's lab welcomes collaborations in designing and developing advanced bioimaging and biosensing platforms for sensitive, selective and quantitative non-invasive detection, enabling precise characterisation and longitudinal monitoring of skin health and disease-associated changes.



RESEARCH THEMES

Skin Diagnostics

Non-invasive Objective Detection

Photoacoustic Imaging

Asian Skin Studies

Translational MedTech

Biomarker Detection

Vascular Health Applications

Women's Health Applications

Quantitative Treatment Monitoring

SKIN MEDTECH & BIOPHOTONICS

Prof. Malini Olivo

Distinguished A*STAR Fellow

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Advancing light-based technologies
for precision skin health & diagnostics

Enabling non-invasive imaging, optical diagnostics and
translational medtech solutions

SCIENTIFIC LEADERSHIP

Professor Malini Olivo is a Distinguished A*STAR Fellow and Distinguished Principal Scientist, who is globally recognised as a pioneer in optical diagnostics. Her work bridges advanced photonics, point-of-care technologies and wearable devices with unmet clinical needs across dermatology, oncology and women’s health. With over 30 years of experience, more than 500 publications and five first-in-human clinical trials, she brings deep scientific leadership and translational expertise to next-generation MedTech solutions.

RESEARCH FOCUS

Optical Imaging & Skin Analysis

Developing advanced optical imaging and spectroscopy platforms to enable precise, non-invasive assessment of skin health, disease and treatment response.

Translational Medtech Platforms

Bridging photonics, engineering and clinical needs to develop medtech solutions for diagnostics, image-guided interventions and patient care.

Nanophotonics & Biosensing

Advancing nanophotonics and SERS-based technologies for sensitive biomarker detection, early diagnosis and improved disease monitoring.

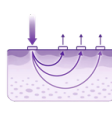
CORE CAPABILITIES



Confocal Raman spectroscopy



Photoacoustic imaging



Handheld diffuse reflectance spectroscopy



Optical/Digital twin modelling



Prototype generation



Automated diagnostic systems



Clinical translation & human studies



AI & advanced image analysis

COLLABORATIONS



Professor Olivo’s lab welcomes collaborations in optical diagnostics, biophotonic technologies, device development, clinical validation and data-driven innovation to translate research into real-world impact.



RESEARCH THEMES

Optical Imaging

Spectroscopy

Biophotonics

Digital Health

Skin Physiology

Diagnostics

AI Analytics

Device Innovation

SKIN MEDTECH & BIOPHOTONICS

Dr Bi Renzhe
Principal Investigator

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Advancing quantitative health assessment
through bio-optical technologies

Using skin as an accessible window to reveal structural, biochemical, vascular and metabolic information for dermatology and systemic health

SCIENTIFIC LEADERSHIP

Dr Bi Renzhe develops innovative bio-optical technologies for non-invasive and quantitative assessment of human health. His work integrates photoacoustic imaging, Raman spectroscopy, diffuse optics, laser speckle technologies and wearable sensing to measure tissue structure, biochemical composition, blood flow and metabolic responses. These technologies are being developed for applications spanning dermatology, vascular diseases, oncology and metabolic health, including quantitative skin assessment, peripheral vascular disease screening, tumour characterisation and treatment monitoring.

RESEARCH FOCUS

Bio-Optical
Technologies

Developing innovative imaging and sensing technologies to non-invasively interrogate tissue structure, biochemical composition, vascular function and metabolism.

Quantitative Health
Assessment

Applying optical measurements to objectively assess skin properties and deeper haemodynamics, while revealing vascular and metabolic changes associated with systemic health conditions.

Optical Spectroscopy
for Dermatology

Applying spectroscopic technologies to assess skin conditions, monitor treatment response and support quantitative evaluation beyond conventional visual assessment.

CORE CAPABILITIES



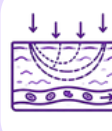
Raman spectroscopy & biochemical analysis



Photoacoustic & multimodal imaging



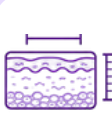
Wearable & point-of-care technologies



Diffuse optics & deep-tissue blood flow sensing



Laser speckle vascular & microcirculation imaging



Quantitative skin & tissue measurement



Vascular function & haemodynamic assessment



MedTech development & technology translation

COLLABORATIONS



Dr Bi's lab welcomes collaborations across biophotonics, dermatology, vascular medicine, oncology and MedTech. His technologies support assessment of skin health, vascular function, tumour biology and treatment response, while advancing bio-optical innovations towards clinically relevant diagnostic and monitoring devices.



RESEARCH THEMES

MedTech

Wearable Technologies

Diffuse Optical Devices

Photoacoustic Imaging System Development

Signal and Image Analysis Algorithms

Raman Spectroscopy System Development

Horizontal Platforms

Enabling Technologies that Accelerate Discovery

Our horizontal platforms provide specialised technologies, models and analytical capabilities that support research across A*STAR Skin Research Labs. By integrating human-relevant skin models, advanced molecular profiling and computational analysis, these platforms enable researchers to investigate skin biology at multiple levels and accelerate the translation of discoveries into new insights, technologies and applications.



Asian Skin Biobank & Model Development

- A unique resource dedicated to understanding the diversity of Asian skin.
- Holds >40,000 vials of primary skin cells from >150 donors across 8 ethnicities with whole genome sequencing data.
- Enables customisable 2D, 3D and ex-vivo human skin models for discovery, clinical translation and industry research.



Skin Omics

- Harnesses omics technologies for discovery of novel biomarkers and therapeutic targets.
- Uses cutting-edge mass spectrometry for targeted and untargeted metabolomics in solid and liquid samples, including MALDI workflows and spatial metabolomics.
- Supports novel bioactive discovery including microbiome-derived molecules.



Bioinformatics

- Integrates, manages and analyses complex multi-omics and imaging datasets.
- Develops pipelines and AI/ML tools for pattern discovery, biomarker identification and predictive modelling.
- Translates data into actionable biological insights to support decision-making and innovation.

HORIZONTAL PLATFORMS

Dr Adaikalavan Ramasamy

Platform Lead (Bioinformatics)

A*STAR Skin Research Labs (A*STAR SRL), Skin Research Institute of Singapore (SRIS) & Genome Institute of Singapore (A*STAR GIS)

Decoding complex biological data through computational genomics

Advancing science through single-cell and spatial analytics for biomedical discovery and translation.

SCIENTIFIC LEADERSHIP

Dr Adaikalavan Ramasamy is a Principal Investigator at A*STAR Skin Research Labs and is jointly appointed with the Genome Institute of Singapore. He leads the Bioinformatics Consulting and Training Platform (BISCUITS). With expertise in applied statistics, bioinformatics and computational genomics, he develops and applies analytical approaches to extract robust biological insights from complex datasets. His work supports multidisciplinary research through rigorous study design, statistical programming and the analysis of next-generation sequencing (NGS), single-cell and spatial transcriptomic data.

RESEARCH FOCUS

Single-Cell & Spatial Transcriptomics

Developing and applying computational workflows to analyse cellular diversity, spatial organisation and molecular changes in tissues across health and disease.

Computational Genomics & NGS Analysis

Using computational, statistical and bioinformatic approaches to process, integrate and interpret large-scale genomic and transcriptomic datasets.

Bioinformatics Consulting & Capability Building

Supporting researchers with experimental design, data analysis, interpretation and training to strengthen reproducible and impactful biomedical research.

CORE CAPABILITIES



NGS study design & experimental planning



Spatial transcriptomics analysis

Visium HD, Xenium, Stereo-seq, CosMX



Single-cell RNA-seq analysis

10x Genomics, Smart-seq, BD Rhapsody



High dimensional systems biology



Custom algorithm & software development



Reproducible NGS analysis workflows



Data integration & harmonization of public datasets



Courses for statistical programming & NGS analysis

COLLABORATIONS



Dr Ramasamy's team welcomes collaborations that require bioinformatics, statistical and computational expertise to translate complex omics datasets into biological insights. The platform supports projects spanning study design, single-cell and spatial transcriptomics, NGS, data integration and analytical capability building.

RESEARCH THEMES

Skin/Hair Health, Ageing & Disease

Biomarker Discovery & Disease Target Identification

Training & Research Capability Building

Data Integration & Harmonisation

Comparison of Omics Technologies

Bespoke Single-cell & Spatial Transcriptomics Analysis

HORIZONTAL PLATFORMS

Dr Lee Sze Han
Platform Lead (Skin Omics)

A*STAR Skin Research Labs (A*STAR SRL) &
Skin Research Institute of Singapore (SRIS)

Decoding skin biochemistry through
advanced omics

Applying mass spectrometry and spatial omics to uncover metabolic
pathways, biomarkers and molecular changes that shape skin health
and disease

SCIENTIFIC LEADERSHIP

Dr Lee Sze Han is the Platform Lead of the Skin Omics Platform at A*STAR Skin Research Labs. His work applies advanced mass spectrometry to measure and interpret the small molecules present in skin and related biological samples. By integrating targeted and untargeted metabolomics with spatial mass spectrometry imaging, his team identifies biochemical changes associated with skin physiology, barrier function, disease and treatment response. He also leads the development of robust analytical workflows that support biomarker discovery, mechanistic investigations and translational studies across the skin research community.

RESEARCH FOCUS

Skin Metabolomics and
Biomarker Discovery

Profiling metabolites in skin, tape strips, biopsies, tissue exudates and other samples to identify biomarkers and biochemical pathways associated with skin health, disease and therapeutic response.

Targeted and Untargeted
Mass Spectrometry

Developing quantitative and discovery-based liquid chromatography-MS workflows for sensitive measurement, identification and validation of skin-related metabolites and probe compounds.

Spatial Omics and
Molecular Imaging

Using mass spectrometry imaging (DESI, MALDI) to map the distribution of metabolites and other molecular features within skin while preserving biologically meaningful spatial information.

CORE CAPABILITIES



Targeted
metabolite
quantification



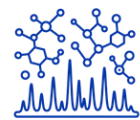
LC-MS/MS
method
development



Clinical and
biological
sample analysis



Multivariate and
pathway analysis



Untargeted
metabolomics



Spatial mass
spectrometry
imaging



Biomarker
discovery and
validation



Study design
and data
interpretation

COLLABORATIONS



Dr Lee's team welcomes collaborations that use metabolomics and spatial omics to investigate skin biology, discover biomarkers and characterise molecular responses to disease, treatments, ingredients and topical formulations. The platform supports projects from experimental design through MS analysis to biological interpretation.



RESEARCH THEMES

Acne

Atopic Dermatitis

Skin Ageing

Skin Barrier Biochemistry

Skin Lipids Biochemistry

Skin Microbiome

HORIZONTAL PLATFORMS



Alicia Yap
Platform Lead (Asian Skin Biobank and Model Development)

A*STAR Skin Research Labs (A*STAR SRL) & Skin Research Institute of Singapore (SRIS)

Advancing skin research through quality-driven biobanking and advanced skin models

Enabling access to high-quality Asian skin samples, cells and human-relevant models for research and translation

SCIENTIFIC LEADERSHIP

Alicia Yap leads operations at the Asian Skin Biobank and Model Development, a core platform supporting skin research through high-quality human skin samples, primary skin cells and three-dimensional skin models. With a background in life sciences and training in Laboratory Management (ISO 17025), she oversees the platform’s biobanking activities, quality systems and research services, enabling access to well-characterised Asian skin resources for studies spanning skin health, ageing and disease. Her work supports robust, reproducible and human-relevant research across A*STAR Skin Research Labs and its partners.

RESEARCH FOCUS

Asian Skin Biobanking

Collecting, processing, characterising and preserving donated surgical waste skin tissues and donor-derived primary skin cells from diverse Asian populations.

Human Skin Models

Providing reconstructed epidermal and full-thickness skin equivalents, de-epidermised dermis models and customised models for studies of pigmentation, ageing, inflammation, repair and disease.

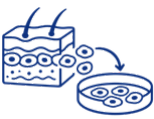
Skin Testing and Research Services

Delivering standardised and customised 2D and 3D assays, histology and tissue-based services to evaluate skin biology, barrier function, product penetration and treatment response.

CORE CAPABILITIES



Human skin tissue biobanking



Primary skin cell isolation and culture



Reconstructed epidermal skin models



Full-thickness 3D skin equivalents



Ex vivo tissue preparation



Skin cell and tissue-based assays

COLLABORATIONS



Ms Yap’s team welcomes collaborations requiring high-quality Asian skin samples, donor-derived cells, human-relevant skin models and customised services. The platform supports selection of suitable biological materials and develops fit-for-purpose assays for mechanistic studies, product evaluation, preclinical and translational research.

RESEARCH THEMES

Asian Skin Diversity

Biobanking

Tissue Repair and Healing

Skin Health and Ageing

Skin Disease Modelling

3D Human Skin Models

Contact Us

Let's Shape the Future of Skin Health Together

A*STAR Skin Research Labs partners with healthcare, industry, academic and public-sector stakeholders to advance skin science and translate discovery into meaningful impact.

We welcome conversations on collaboration, validation, innovation and strategic partnerships.



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