



ALBERTA FAMILY WELLNESS INITIATIVE

# BRAIN STORY CERTIFICATION

Course Outline



# ABOUT THE COURSE

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Brain Story Certification is an in-depth course for professionals interested in the scientific underpinnings of the Brain Story. The course offers:

- Video of over 30 leading experts in neurobiology and mental health
- Certification in Brain Story science

## COURSE GOALS

After taking this course learners will be able to:

- Explain how brains develop and how social interactions shape development.
- Describe the effects of stress on brain development, and the impact of adverse childhood experiences on physical and mental health outcomes, including addiction.
- Identify evidence-based approaches for children in the prevention, intervention, and treatment of childhood adversity.
- Describe the basic neurobiology of both substance and process addiction.
- Identify evidence-based approaches for adults in the prevention, intervention, and treatment of addiction.
- Identify ways to build the foundations of resilience in children and families.

## EVALUATION (GRADING)

To be certified, learners are required to pass a series of multiple choice evaluation questions at the end of each learning module. The passing grade is 100%, but learners will have the opportunity to correct erroneous answers after reviewing relevant course content.

## CERTIFICATION AND ACCREDITATION

### **Certification**

Learners who pass the evaluation questions will receive a certificate in Brain Story science.

### **Accreditation**

The Brain Story Certification Course is eligible for accreditation through a number of professional bodies. You may be required to apply directly to your professional organization to receive credits. Please inquire for more details.

# COURSE OUTLINE

## MODULE 1 – INTRODUCTION

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### **By the end of this module, learners will be able to:**

- Recognize the application of early brain development science as a foundation for improving outcomes for children and families.
- Explain why using a common language to share this knowledge is a cornerstone of creating and sustaining change.
- Understand how to navigate the online course environment.
- Understand the course evaluation and certification process.

### **Faculty**

- 1 Jack Shonkoff, MD, Centre on the Developing Child, Harvard University
- 2 Nat Kendall-Taylor, PhD, Frameworks Institute
- 3 Bryan Kolb, PhD, FRSC, University of Lethbridge

*Public Engagement Resource: Palix/AFWI Video, How Brains Are Built: The Core Story of Brain Development*

## MODULE 2 – BRAIN ARCHITECTURE: HOW BRAINS DEVELOP

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### **By the end of this module, learners will be able to:**

- Describe key stages in pre- and postnatal brain development.
- Explain how experiences shape the developing brain.
- Order developmental ages and stages in terms of their relative plasticity.
- Identify the age at which the brain reaches maturity.

### **Faculty**

- 1 Tom Boyce, MD, University of British Columbia
- 2 Charles Nelson, PhD, Harvard University
- 3 Bryan Kolb, PhD, FRSC, University of Lethbridge
- 4 Judy Cameron, PhD, University of Pittsburgh

*Public Engagement Resource: Palix/AFWI Video, Brain Architecture*

## MODULE 3 – GENE SIGNATURES: HOW GENE-ENVIRONMENT INTERACTIONS SHAPE BRAIN ARCHITECTURE & OUTCOMES

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### **By the end of this module, learners will be able to:**

- Formulate a basic definition for epigenetic change.
- Identify one key developmental experience that produces epigenetic change.
- List two outcomes associated with the quality of parental care that are caused by epigenetic changes.
- Provide one example of how early experiences can buffer genetic influences.

### **Faculty**

- 1 Tom Boyce, MD, University of British Columbia
- 2 Michael Meaney, PhD, McGill University
- 3 Stephen Suomi, PhD, National Institute of Child Health and Human Development
- 4 Judy Cameron, PhD, University of Pittsburgh

## MODULE 4 – SERVE AND RETURN: HOW SOCIAL INTERACTIONS SHAPE BRAIN DEVELOPMENT

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### **By the end of this module, learners will be able to:**

- Recognize the importance of social interactions in healthy brain development.
- Explain a prototypical social interaction using the “serve and return metaphor.
- Describe how social competencies and temperaments influence child behaviour and outcomes.
- List one developmental consequence each of absent social interactions with parents and with peers.

### **Faculty**

- 1 Tom Boyce, MD, University of British Columbia
- 2 Heather Henderson, PhD, University of Miami
- 3 Judy Cameron, PhD, University of Pittsburgh

*Public Engagement Resource: Palix/AFWI Video, Serve and Return*

## MODULE 5 – TOXIC STRESS: HOW EARLY LIFE STRESS SHAPES BRAIN ARCHITECTURE

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### **By the end of this module, learners will be able to:**

- Identify two brain structures involved in the stress response system.
- List two types of stress hormones and describe the roles of each in orchestrating the body's response to threat.
- Describe the three different types of stress and classify different types of stressful events into each category.
- Describe three ways the brain and body adapt to toxic stress that can produce vulnerability to later health outcomes.

### **Faculty**

1 Matthew Hill, PhD, University of Calgary

2 Judy Cameron, PhD, University of Pittsburgh

3 Megan Gunnar, PhD, University of Minnesota

*Public Engagement Resource: Palix/AFWI Video, Toxic Stress*

## MODULE 6 – AIR TRAFFIC CONTROL: THE IMPORTANCE OF BUILDING EXECUTIVE FUNCTION

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### **By the end of this module, learners will be able to:**

- List three key skills involved in executive function and provide a behavioural example of each.
- Explain how serve and return interactions help build executive function skills.
- Explain how toxic stress interferes with the development of executive function skills.
- List three activities and interventions that help build executive function skills.

### **Faculty**

1 Deborah Phillips, PhD, Georgetown University

*Public Engagement Resource: Palix/AFWI Video, Air Traffic Control*

## MODULE 7 – INTERVENTIONS ADDRESSING CHILD MALTREATMENT & NEGLECT

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### **By the end of this module, learners will be able to:**

- List key sources of toxic stress and maltreatment in children.
- Identify three biological outcomes common to children in foster care.
- Describe the key elements of the Nurse Family Partnership (NFP), an evidence-based home visitation program.
- Describe the key elements of Child-Parent Psychotherapy (CPP), a two-generation intervention for maltreated children.

### **Faculty**

- 1 Harriet MacMillan, MD, McMaster University
- 2 Patricia Van Horn, JD, PhD, University of California, San Francisco
- 3 Philip Fisher, PhD, University of Oregon

## MODULE 8 – CHILDREN'S MENTAL HEALTH PART A: THE INFLUENCE OF CHILD TEMPERAMENTS ON ANXIETY & ADHD

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### **By the end of this module, learners will be able to:**

- List two brain circuits that mediate behavioural inhibition and anxiety disorders.
- Explain how behavioural inhibition can lead to anxiety disorders in some children.
- Identify the key features of attention deficit hyperactivity disorder (ADHD).
- List two brain circuits that mediate inattention and impulsivity.
- Describe how ADHD increases vulnerability to adolescent and young adult psychopathology.

### **Faculty**

- 1 Nathan Fox, PhD, University of Maryland
- 2 Stephen Hinshaw, PhD, University of California, Berkeley

## MODULE 9 – CHILDREN’S MENTAL HEALTH PART B: IMPROVING SERVICES

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### **By the end of this module, learners will be able to:**

- Define an evidence-based practice and give three examples currently being used in children’s mental health services.
- Identify two challenges of applying evidence-based practices in real-world clinical settings.
- Describe two ways to overcome these challenges.
- Describe why it is important to provide prevention programs for children of parents with depression.
- Identify three key elements of successful prevention programs.

### **Faculty**

- 1 William Beardslee, MD, Harvard University
- 2 John Weisz, PhD, ABPP, Judge Baker Children’s Center, Harvard University
- 3 John Steven March, MD, MPH, Duke University

## MODULE 10 – ACES PART A: THE IMPACT OF ADVERSE CHILDHOOD EXPERIENCES ON A RANGE OF ADULT HEALTH OUTCOMES

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### **By the end of this module, learners will be able to:**

- List ten different types of common adverse childhood experiences (ACEs).
- List five different health and social outcomes that are associated with the presence of ACEs.
- Explain one possible pathway to adult heart disease that is mediated by the presence of ACEs.
- Explain one possible pathway to addictive disorders that is mediated by the presence of ACEs.

### **Faculty**

- 1 Vincent Felitti, MD, Kaiser Permanente
- 2 Robert Anda, MD, MS, U.S. Centers for Disease Control and Prevention
- 3 Andrea Danese, MD, PhD, King’s College London



## MODULE 11 – ACES PART B: USING THE SCIENCE OF ACES IN PRACTICE

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### **By the end of this module, learners will be able to:**

- Describe how adverse childhood experiences (ACEs) can lead to poor learning and social outcomes in children and adults.
- Describe two ways to ask patients about ACEs in health care settings.
- Describe the key elements of the Healthy Steps Program.

### **Faculty**

- 1** Robert Anda, MD, MS, U.S. Centers for Disease Control and Prevention
- 2** Vincent Felitti, MD, Kaiser Permanente
- 3** Rahil Briggs, PsyD, Healthy Steps at Montefiore

## MODULE 12 – ACES PART C: THE IMPACT OF ADVERSE CHILDHOOD EXPERIENCES ON PTSD & DEPRESSION

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### **By the end of this module, learners will be able to:**

- Explain how ACEs contribute to posttraumatic stress disorder (PTSD) in adulthood.
- Identify two key brain areas involved in PTSD.
- Describe the effects of dysregulated emotions that commonly accompany PTSD.
- Identify key brain structures involved in depression.
- Describe the link between depression and other physical health problems.

### **Faculty**

- 1** Ruth Lanius, MD, PhD, University of Western Ontario
- 2** Glenda MacQueen, MD, PhD, FRCPC, University of Calgary

## MODULE 13 – ADDICTION & THE BRAIN PART A: A NEUROBIOLOGICAL PERSPECTIVE

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### **By the end of this module, learners will be able to:**

- Describe a three-stage conceptual model of addiction that can be applied to both drugs of abuse and behaviours.
- Identify the key brain structures and functions involved in the binge/intoxication stage.
- Identify the key brain structures and functions involved in the withdrawal/negative affect stage.
- Identify the key brain structures and functions involved in the preoccupational/anticipation stage.
- Recognize that drugs of abuse act on discrete brain systems but share a common neurochemical effect on the reward system.

### **Faculty**

- 1 Mark Gold, MD, University of Florida
- 2 George Koob, PhD, National Institute on Alcohol Abuse and Alcoholism
- 3 Pat Levitt, PhD, University of Southern California

## MODULE 14 – ADDICTION & THE BRAIN PART B: PROCESS ADDICTIONS

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### **By the end of this module, learners will be able to:**

- Explain the similarities between the brain changes associated with compulsive drug use, obesity, and problematic sexual behaviour.
- Describe key ways in which eating and sexual behaviour have changed in the past 30 years that might make individuals more susceptible to these addictions.
- Describe three ways that multiple addictions interact with each other.
- Explain the role of trauma in addiction interactions.

### **Faculty**

- 1 Mark Gold, MD, University of Florida
- 2 James Montgomery, MD, Pine Grove Behavioral Health and Addiction Services
- 3 Patrick Carnes, PhD, CAS, International Institute for Trauma and Addiction Professionals

## MODULE 15 – THE EFFECTS OF TOXIC STRESS, ADDICTION, & DEPRESSION ON PARENTING

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### **By the end of this module, learners will be able to:**

- Explain the roles of the reward and executive function systems in producing appropriate, supportive, parental behaviour.
- Describe three changes that occur in the reward and/or executive function systems as a result of becoming a parent.
- Explain how maternal depression interferes with normal parenting behaviour.
- Explain how maternal addiction interferes with normal parenting behaviour.
- Identify the key element of two interventions for depressed and substance abusing mothers that can improve parent-child attachment.

### **Faculty**

1 Linda Mayes, MD, Yale School of Medicine

## MODULE 16 – ADDICTION TREATMENT PART A: FAMILY-BASED APPROACHES

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### **By the end of this module, learners will be able to:**

- Explain how addiction affects a family system.
- Describe how parents and spouses change their behaviour to support an addicted family member.
- Describe how children change their behaviour to support an addicted family member and how this influences their developmental outcomes and trajectories.
- Describe the significant milestones of family reorganization that occur after the addicted person stops using.

### **Faculty**

1 Claudia Black, PhD, The Meadows Treatment Center

2 Ariella Goodwine Fisher, MFT, The Addictions Institute

## MODULE 17 – ADDICTION TREATMENT PART B: SPECIALIZED APPROACHES FOR WOMEN & INDIGENOUS POPULATIONS

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### **By the end of this module, learners will be able to:**

- List four elements that should be present in comprehensive treatment for women.
- Define trauma-informed services.
- Describe the major difference between how men and women experience trauma in childhood, adolescence, and adulthood.
- Explain how the residential school system affected parenting in indigenous communities.
- Define historical trauma.
- Explain how key aspects of the Wellbriety movement can be used to support whole-community healing.

### **Faculty**

1 Stephanie Covington, PhD, LCSW, Center for Gender and Justice

2 Don Coyhis, White Bison Inc.

## MODULE 18 – ADDICTION TREATMENT PART C: IMPROVING SERVICES

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### **By the end of this module, learners will be able to:**

- Describe the basic differences in services provided for addiction compared to other chronic diseases.
- Describe key aspects of the Physician Health Program (PHP) treatment model.
- Identify three ways in which PHPs apply chronic-disease management principles in their addiction treatment services.
- Identify five key steps in the NIATx process improvement model.
- Describe three ways in which integrating substance use screening in primary care could improve population health outcomes.

### **Faculty**

1 Thomas McLellan, PhD, Treatment Research Institute

2 Dianne Maier, MD, Alberta Medical Association

3 Michael Kaufmann, MD, Ontario Medical Association

4 David Gustafson, PhD, University of Wisconsin-Madison

## MODULE 19 – USING THE SCIENCE OF EARLY BRAIN DEVELOPMENT TO BUILD RESILIENT CHILDREN, FAMILIES & COMMUNITIES

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### **By the end of this module, learners will be able to:**

- Define resilience and explain how it works.
- Explain how building adult skills can lead to better outcomes for children.
- Describe the translational research cycle and how it can be used to inform the development of new interventions.
- Describe a theory of change and how it can be used to inform program evaluation.

### **Faculty**

**1** Jack Shonkoff, MD, Center on the Developing Child, Harvard University

**2** Melanie Berry, PsyD, University of Oregon

**3** Robert Anda, MD, MS, U.S. Centers for Disease Control and Prevention

*Public Engagement Resource: Palix/AFWI Video, Brains: Journey to Resilience*